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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

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[For some time it has been considered by the staff of the Bureau that a useful addition to the abstracts in the *Tropical Diseases Bulletin* would be a series of summaries collating the information contained in the abstracts. This suggestion has received support from officers of the Colonial Medical Service abroad, and it has therefore been decided to publish each month, from January 1939 onwards, a summary of the abstracts on a particular subject which have appeared in the volume of the *Tropical Diseases Bulletin* for the preceding year. The first of these is printed below. The information from which these summaries have been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1938, Vol. 35. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.]

SUMMARY OF RECENT ABSTRACTS.

I. CHOLERA.

Epidemiology.

PARTHASARATHY and SUNDARARAJAN (p. 303) find, on analysis according to the periodogram method, that in the Southern Indian State of Mysore cholera occurs in a periodicity of six years. TURNBULL (p. 738) states that epidemics in South China appear in the hot rainy months and occur about every five years. The Eastern Bureau of the League of Nations Health Organisation (p. 735) notes that epidemics are associated with high relative humidity, high temperature and intermittent rain, and that cholera spreads along the highways of human traffic and that man is himself the chief agent of spread. RAYNAL and LIEOU (p.738) attribute an explosive outbreak in Shanghai to the incursion of war refugees. MALVAL and PALUD (p. 738) ascribe the disappearance of this epidemic to two factors, one climatic, the passing of the hot weather, and the other prophylactic, rapid segregation and vaccination.

The possibility of the spread of cholera by pollution of sea water and food materials has been investigated. The Eastern Bureau of the League of Nations Health Organisation (p. 735) reports that in Japan the vibrio is said to be capable of surviving in sea water for 47 days, and that fish and shell fish may become infected and pass on the infection to persons consuming them. GENEVRAY and BRUNEAU

[using both pure sodium chloride and crude sea salt, which gave approximately equal results] (p. 742) record the following experimental results : (1) the vibrio cannot grow if the concentration of salt exceeds 8 per cent. (2) It remains alive in concentrations of 9 to 11 per cent. for 24–48 hours, in 8 per cent. for two weeks or more, in 5 to 7 per cent. for three weeks or more, and in 2·5 per cent. for four weeks or more. [The total salinity of ocean water is from about 3·3 to 3·7 per cent.]

The same authors (p. 742) found that the degree of salinity of certain foodstuffs determined the length of life of cholera vibrios incorporated in them. Soya milk and soya cheese are consumed on the day of preparation, and as the vibrios can live in them for 12 hours they may be dangerous in epidemic periods.

Aetiology.

For the identification of vibrios causally related to epidemic cholera, GARDNER and WHITE (p. 306) emphasize the reliability of serum containing specific "O" (somatic), but not "H" (flagellar), agglutinins. All specific vibrios give the type 1 Heiberg reaction (fermenting mannose and saccharose, but not arabinose) which, however, is not peculiar to these vibrios, and they fail to haemolyse goat erythrocytes. To these, TAYLOR (p. 305) adds that the true cholera vibrios give positive cholera red and negative Voges Proskauer reactions. El Tor vibrios gave positive Voges Proskauer reactions in 5 of 6 strains. "There have not been isolated vibrios of any other serological type than the classical *V. cholerae* from any series of clinical cases of cholera which have been chronologically or geographically connected." DE VOGEL (p. 734) however reported an important outbreak of clinical cholera in the Celebes Islands in which from 47 patients with typical symptoms a vibrio of the El Tor type was isolated.

POPESCO-COMBIESCO and WISNER (p. 307) find it impossible to lay down absolute characters in the morphology of *V. cholerae*. Indole formation is common to various vibrios, but if a vibrio fails to haemolyse a suspension of goat erythrocytes and is agglutinated by specific serum it may be certainly taken to be a true cholera vibrio. Sugar fermentation according to Heiberg's group 1 is a characteristic of true cholera vibrios.

VENKATRAMAN and PANDIT (p. 739) record a severe epidemic of cholera in South India caused by the Ogawa type of vibrio. This does not support Japanese work which associates that type with sporadic or mild cases.

MARRAS (p. 309) distinguishes the El Tor vibrio by its haemolytic character and by the fact that it does not produce the symptoms of cholera and does not possess the epidemiological characters of the cholera vibrio. The Cholera Commission of the Office International d'Hygiène Publique (p. 734) agrees that the designation El Tor should be restricted to strains which give agglutination with O Group No. 1 cholera serum, and that they may have Inaba or Ogawa antigenic structure.

RAJA (p. 303) states with reference to the spontaneous variability of cholera vibrios that vibrios isolated from secondary cases do not always correspond serologically with those from primary cases, though the source of infection must have been the primary cases [see below, *Research*].

GENEVRAY and BRUNEAU (p. 741) give a detailed account of the characters, which appear to have been uniform, of 500 strains studied

in the epidemic of Tonking. Details will be found in the original abstract.

Lefebvre and Gallut (p. 740) describe a selective medium, modified from that of Vedder and van Dam, for the isolation of *V. cholerae*. Colonies appear in 10 to 12 hours. For details of the preparation of the medium the original abstract should be consulted. Abe (p. 310) describes a fluid medium containing a decoction of mulberry leaves in which cholera and cholera-like vibrios grow with the production of acid, unlike the dysentery and salmonella groups of bacilli. The difference is explained by the fact that the leaves contain saccharose, which is fermented by the vibrios but not by the dysentery and salmonella group. White (p. 306) makes the point that in the case of original isolation cultures the presence of choleraphage may possibly be capable of reducing the numbers of *V. cholerae* in relation to insensitive secondary invading vibrios.

The Medical Research Institute of Shillong (p. 740) reports that in certain undoubted cases of clinical cholera it seemed impossible to find agglutinable vibrios, and that the presence or absence of phage infecting the vibrio in nature did not appear to influence their agglutinability.

Pang (p. 743) describes an organism with a single polar flagellum isolated by blood culture from a debilitated patient. This was antigenically related to *V. cholerae*. Vibrios inagglutinable by cholera sera, and divisible into two groups, were isolated from cases of enteritis by Hisano (p. 743). Lieou (p. 743) reports the isolation of a cholera vibrio from the heart blood of a guineapig infected by means of the gastric contents of a patient with *cholera sicca*.

Clinical.

Doorenbos (p. 741) remarks that only one of the properties of the cholera vibrio remains uncontested, that it is a Gram-negative vibrio. Clinically cholera may vary from simple diarrhoea to the typical highly fatal type. There are two main types, the epidemic and the endemic, but there still remains only one cholera vibrio, in the more or less complete state, or showing dissociation in its properties.

The Cholera Commission of the Office International d'Hygiène Publique (p. 734) considers that in spite of the improvement in bacteriological diagnosis the practical criterion of cholera still remains the clinical one and that this should form the basis for administrative and prophylactic action.

Treatment.

Turnbull (p. 739) describes a routine treatment which consisted in—administering first, intravenously, sod. bicarb. 160 grs.; sod. chloride 60 grs.; water 1 pint in order to counteract acidosis. This was followed by intravenous hypertonic salt solution—sod. chloride 120 grs.; calc. chloride 4 grs.; pot. chloride 6 grs.; water 1 pint. Four pints of this solution at 104°F. may be given in an hour and it may be repeated 2 or 3 times a day. During the flow of the fluid the pulse and blood pressure are watched and the administration is stopped when blood pressure comes back to normal and the pulse becomes full and bounding. The state of the pulse is the index for repetition of

treatment and 1/50 grain atropine is given twice daily to prevent pulmonary oedema. Cases treated in hospital amounted to 400 to 500, and the deaths to 35 to 40.

LAMB (p. 745) quotes a standard treatment consisting of intravenous salt solution and the administration, by the mouth, of kaolin 1½ lb. in a quart of water, the dose being one ounce every 15 minutes. NAAME (p. 745), on the basis of the similarity between the symptoms of cholera and those of hypoadrenalism, and the possibility that the former may be due to selective action of the cholera toxin on the suprarenal glands, has instituted a treatment by adrenalin, which he administers in subcutaneous doses of 4 to 6 mgm. every 24 hours for some days, combined with injections of artificial serum if there is much dehydration.

LE ROUZIC (p. 304) obtained data which appeared to show that patients receiving all types of treatment simultaneously—Raymond's hypertonic serum, camphorated oil, adrenalin and bacteriophage—had the greatest chance of recovery. Mortality among treated cases was 43·6 per cent. [But the average of a large number of recorded outbreaks is about 50 per cent.] TAYLOR (p. 306) reports that results obtained in Calcutta show no appreciable difference in the death rate of cases treated by bacteriophage and the control series, but that a certain value attaches to bacteriophage treatment added to ordinary methods when only the figures for cases in which agglutinable vibrios were isolated are taken into account.

Control.

" Preventive measures on the occurrence of suspected cases of cholera should not await the isolation of a typical O agglutinable vibrio." This is the opinion expressed by the Cholera Commission of the Office International d'Hygiène Publique (p. 734). The writer of the article in the Washington *Public Health Reports* (p. 304) states that " Because *protected* water supplies and *protective* milk supplies are the rule instead of the exception in American cities to-day, cholera is no longer the menace to this country that it was during the last century " (italics not in the original).

HEGGS (p. 735) writing of Iraq, states that among the most important means of prevention are the supply of advance information from other countries of the existence of cholera and the compulsory inoculation imposed on Haj pilgrims. Inoculation of cholera vaccine is the mainstay of preventive measures ; it is intended also to use cholera phage. Police control of population movement is attempted, but cannot deal with the problem of carriers. Stress is laid on the correct recognition of the first cases, and the diagnosis is primarily based on clinical and epidemiological grounds.

TAYLOR (p. 306) details the essentials for strains from which vaccine should be prepared. Strains should (1) be smooth and translucent ; (2) form stable suspensions in normal salt solution ; (3) have the serological characters of group " O " No. 1 GARDNER and VENKATRAMAN, subtype Inaba and agglutinate to a significant titre with serum prepared from the desiccated Inaba " O " antigen provided by the standards laboratory of Oxford ; (4) ferment mannose and saccharose, but not arabinose ; (5) not be haemolytic ; (6) be isolated from cases of cholera during an epidemic ; (7) be highly stable even in subculture.

Millar and Mohi-Ud-Din (p. 303) found the percentage incidence of cholera in three statistically comparable categories of persons in Kashmir to be as follows :—

(1) Inoculated with 0·5 cc. vaccine, incidence 0·49 per cent.
(2) Inoculated with 1 cc. vaccine, incidence 0·29 per cent.
(3) Not inoculated, incidence 11·35 per cent.

Vaccination with 1 cc. is therefore recommended.

Research.

Macneal, Frisbee and Krumwiede (p. 310) point out differences between the lysis of vibrios by cholera immune serum and that brought about by bacteriophage. Phage lysis can be transmitted in series, and there are differences in the sizes of the vibrios under the two conditions. Intracellular granules which may possibly possess the power of reproduction and of the secretion of lytic enzymes, are found in the vibrios altered by bacteriophage, but not in those altered by serum.

The investigation of the phenomenon of bacterial variation with regard to *V. cholerae* has been conducted by means of single cell culture. Linton, Seal and Mitra (p. 742) succeeded, by this method, in obtaining a new strain with different biochemical, cultural and serological characteristics and a different chemical structure from those which characterized the culture from which the original single cell was taken. The new strain was still, however, within the protein and polysaccharide framework of the original, and the capacity for transformation was therefore limited. White (p. 743) shows that either R or S cholera vibrios may produce rugose colonies. The rugose habit of growth is due to the property of zooglea or capsule formation by abnormally active secretion of mucinous material. Rugose colonies perpetually revert to their normal S or R habit of proliferation. Linton (p. 209), on the basis of single cell experiments similar to those mentioned above, finds that the association of metabolic activity with chemical groups appears to be reasonably constant, and that it changes in parallel with any change of chemical structure in the course of variation. If these changes occur also in the field, they may provide an answer to the question as to whether cholera cases arise only from previous cases and contacts, or whether chronic carriers of groups IV and V can on occasion start epidemics.

Taylor (p. 305) finds that no vibrio agglutinable or non-agglutinable, made rough by treatment with antiserum, has shown any change in its biochemical reactions.

Vassiliadis (p. 737) finds that extraction by chloroform or ether appears to accentuate the flagellar H agglutination of the cholera vibrio and to cause an H agglutination by anticholera sera to appear in inagglutinable vibrios. He also finds that the haemolysins sometimes produced by the cholera vibrio either spontaneously or under the influence of the anticholera bacteriophage, although they are of the same nature as those of the El Tor vibrio, are much more feeble in their action. The position with regard to the nature of the El Tor vibrio is still far from clear.

Bernard, Guillerm and Gallut (pp. 308, 309) obtained a haemodigestive ferment from nutrient bouillon after 8 days of culture of cholera vibrio, which on certain denatured proteins exerts a tryptic

action extending to the production of tryptophane but not of indole. It has a partial digestive action on the proteins of living vibrios, with individual variations according to the strain, in feebly acid medium. It does not possess haemolytic power, but brings about, in successive stages, the phenomenon of haemodigestion as described by VAN LOGHEM.

LINTON, SHRIVASTAVA and SEAL (p. 744) find that both the serological character and the quantity of specific polysaccharide are profoundly affected by the medium in which growth takes place, and therefore makes a plea for uniformity of conditions. They give details of a standard medium suggested. *C. W.*

MALARIA.

Précis of Abstracts in this Section.

de Jesus, Jao and Garcia (p. 8) record that *A. minimus* var. *flavirostris* is the most important vector in the Philippines and that benign tertian is the commonest infection in the district of Calauan.

Huff (p. 8) assumes that malaria parasites, mosquitoes and man—all of which are bisexual—are undergoing genetic change. In avian malaria, susceptibility to the parasite is an inherent characteristic of the individual mosquito, transmitted in simple Mendelian fashion. If that is the case with anophelines, a change from a low to a high degree of susceptibility of the mosquito populations is possible, especially in temperate climates where few individuals survive the winter.

Afridi, Abdul Majid and Jaswant Singh (p. 9) record the spleen rates and prevalent anophelines found in Kutch State. *A. stephensi* was the only infected species.

Mitra (p. 9) shows that increased prevalence of malaria in the Manbhum District of Bihar was not reflected by increased mortality from fevers or from all causes.

de Mello (p. 9) details the anophelines found in the malarious districts of Portuguese India and describes control measures. Of these mass administration of quinine and plasmoquine has met with some success.

Wats and Bharucha (p. 10) experimented with a mixture of 2 parts of cashew-nut shell oil and 98 parts of kerosene as a larvicide. One cc. per square foot of water was as effective as 2·5–3 cc. of kerosene alone. The addition of 1 per cent. stearic acid is an advantage. The cashew-nut oil must be freshly prepared but is cheap.

Boyd and Schlackman (p. 10) note that the mortality rate in malaria (usually subtertian) in drug addicts is much higher than the ordinary rate. The condition may resemble diabetic coma, insulin shock or various neurological conditions.

Ciuca and his colleagues (p. 11) report experiments on anti-malarial drugs. Quinine hydrochloride, atebrin and acriquine are about equal in therapeutic efficacy, aristoquine slightly less. Not less than 1 gm. of quinine or 0·3 gm. of atebrin should be given daily for at least 7 days. Plasmoquine should not be mixed with atebrin, but if used after atebrin is efficient in preventing relapses in quartan and subtertian infections. Children under 1 year do not tolerate atebrin. Barbosa (p. 12) advises atebrin (5 days) followed by plasmoquine (4 days) in the treatment of benign and subtertian malaria in Spain.

Pakenham-Walsh and Rennie (p. 12) report a patient inoculated with *P. vivax* who was treated for cystitis by sulphonamide preparations. This treatment apparently caused the disappearance of parasites and cessation of rigors, but a relapse occurred after 7 weeks. Pizzillo (p. 12) records 16 patients with recent primary malaria successfully treated by the Ascoli method.

Kritchevski (p. 13) shows that if trypan blue or pyrrole blue are injected, along with inactive doses of plasmocide, into birds infected with *P. praecox*, a therapeutic effect is obtained although individually these compounds are inert. Both trypan and pyrrole blue are deposited in the reticulo-endothelial system and it is thought that there they react with plasmocide to give a new compound which, however,

cannot be obtained *in vitro*. DEVINE (p. 13) has studied the effects of undecane diamidine. Lethal doses cause liver and kidney damage with hyperglycaemia and nitrogen retention. The upper limits of dosage are discussed.

Senior WHITE (p. 14) confirms his previous work in the Jeypore Hills which showed that *A. culicifacies*, though prevalent, is of no pathogenic importance. Control limited to the *funestus* group has not resulted in deterioration of health and has effected considerable saving in larvicides. The three transmitting species are *A. fluviatilis*, *A. varuna* and *A. minimus*. Similar results (p. 14) were found in the Singhbhum Hills in an intensely malarious country in which transmission occurred in all months except May, June and July.

SINTON and SHUTE (p. 15) show that under favourable conditions of environment *A. maculipennis* infected with *P. vivax* show no higher mortality than uninfected mosquitoes. There is, however, some evidence that under favourable conditions infections with Plasmodium tend to shorten life, but these conditions are not those which usually apply in nature. Death from infection with Plasmodium is therefore not responsible for the fact that certain species are not natural transmitters.

PERAGALLO (p. 15) describes a mosquito trap. *C. W.*

DE JESUS (P. I.), JAO (S. G.) & GARCIA (E. Y.). **Malaria Survey of Calauan, Laguna.**—*Jl. Philippine Islands Med. Assoc.* 1938. May. Vol. 18. No. 5. pp. 291–310. [14 refs.]

Calauan is a small agricultural community, 77 kilometres south of Manila, with a population of 3,038. Though only a few metres above sea level, it is situated at the foot of a mountain range. There is an extensive network of small fresh-water streams which serve as breeding places for *A. minimus* var. *flavirostris*, the most important vector of malaria in the Philippines. Malaria is more prevalent in the outlying parts of the town than in the central part. *Pl. vivax* is most in evidence. The spleen index of primary school-children was 22 in August, 40·4 in March : the parasite index of the same children was 13·8 in August. Very few mosquito dissections were made ; none was found infected.

Norman White.

STRICKLAND (C.). **Holland and Bengal. Reclamation and Malaria in the Two Countries.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Aug. 25. Vol. 32. No. 2. pp. 277–286. With 13 figs. (6 on 1 plate).

HODGKIN (E. P.). **Naturalistic Methods of Malaria Control.**—*Jl. Malaya Branch Brit. Med. Assoc.* 1938. June. Vol. 2. No. 1. pp. 24–29.

HUFF (Clay G.). **The Significance of Different Strains of Malaria and Mosquitoes in the Epidemiology of the Disease.**—Reprinted from *Amer. Jl. Med. Technology*. 1938. Mar. Vol. 4. No. 2. 6 pp. [10 refs.]

This paper contains several interesting speculations. The life-cycle of malaria involves three kinds of animals, parasite, mosquito and man, all of which are bisexual and so subject to greater chance of variation than are unisexual organisms. It seems reasonable to assume that all three are undergoing genetic change. The author has shown that with avian malaria, susceptibility to the parasite is an inherent

characteristic of the individual mosquito, this susceptibility being transmitted in a simple Mendelian fashion. If such should be the case with malaria and Anopheline mosquitoes it might be possible for a mosquito population to change from a low to a high degree of susceptibility, or vice versa. This might well happen in temperate climates where only few individual mosquitoes survive the winter. With regard to strains of malaria parasites that differ only immunologically it would be consistent with general knowledge of heredity to consider such differences as genetic. *N. W.*

Afridi (M. K.), Abdul Majid (S.) & Jaswant Singh. **Malaria in Kutch State.**—*Jl. Malaria Inst. of India* (formerly *Records of the Malaria Survey of India*). 1938. June. Vol. 1. No. 2. pp. 187–213. With 3 maps.

The observations recorded in this paper were made during ten days in January and six weeks in September–October 1937 and were prompted by an increased prevalence of malaria during the closing months of 1936. Kutch is a small State of 4,342 square miles; it is almost an island, being joined to, or separated from, the coast of Sind by an extensive salt marsh. It has an equable climate and a low rainfall (average 12·6 inches). Bhuj is the capital, population 21,858, and Mandvi on the south coast is the chief port, population 25,342. The spleen rates of these two towns, of children from 2 to 10 years of age, were 10·5 and 2·3 per cent. respectively. The highest spleen rate found was 45·1 in Vijaya Vilas Palace in 51 children examined. The most prevalent anophelines were *subpictus*, *culicifacies*, *stephensi* and *annularis*: specimens of *turkhudi*, *fluviatilis* and *barbirostris* were also found. *A. stephensi* was the only species found infected. Recommendations regarding measures for the control of malaria are contained in the report. *N. W.*

Mitra (K.). **Increase of Malaria in Manbhum, 1936.** [Abstract.]—*Jl. Malaria Inst. of India* (formerly *Records of the Malaria Survey of India*). 1938. June. Vol. 1. No. 2. pp. 215–216.

The increased prevalence of malaria reported in the Manbhum District of Bihar was not reflected in any increased mortality ascribed to "fevers" or in increased mortality from all causes. During a brief survey, here reported, malaria was found to be excessively prevalent in villages near the foot-hills. The two highest spleen rates recorded, 85 and 41, were in villages so situated. The anophelines found during the survey were *culicifacies*, *annularis*, *pallidus*, *vagus*, *fluviatilis* and *jeyporiensis*. *N. W.*

de Mello (I. Froilano). La campagne anti-malarienne dans les régions rurales de l'Inde portugaise. [**Anti-Malaria Measures in Rural Areas of Portuguese India.**]—*Riv. di Malariologia*. Sez. I. 1938. Vol. 17. No. 3. pp. 208–224.

Portuguese India comprises three districts, Goa, 3,806 square kilometres, population 505,000; Damaun, 450 square kilometres, pop. 58,000; and Diu, 37 square kilometres, pop. 17,000. In the part of Goa known as the Velhas Conquistas (with the exception of Old Goa) and in certain villages of the Novas Conquistas malaria is very little prevalent, the spleen index being very low. On the other hand

in Pragana, the hinterland of Damaun, forest clad and with a primitive population, as well as in other villages of Damaun and of Diu, malaria is severe and widespread.

The anophelines encountered in Portuguese India include *culicifacies, maculatus, sinensis, listoni, fuliginosus, stephensi, leucosphyrus, pulcherrimus, ludlowi, rossi, jamesi, vagus, barbirostris, culiciformis, karwari, aitkeni, theobaldi* and *minimus.*

In view of the low standard of living and limited financial resources of the country attempts at the control of malaria in rural areas have perforce been limited to mass administration of drugs and small antilarval works around inhabited areas. The author insists, however, that the problem is not a purely medical one : improvement of roads and other means of communication, agricultural improvements, drainage and irrigation, and general hygiene, all call for consideration.

During two years some 5,000 inhabitants of villages having spleen rates in excess of 50 per cent. were treated with quinine and plasmoquine during the pre-epidemic season. A considerable decrease of fever incidence resulted. Plasmoquine 0·02 gm. and quinine sulphate 0·5 gm. are given daily for eight days ; thereafter these two drugs in the same doses are administered once a week for twelve weeks.

N. W.

Wats (R. C.) & Bharucha (K. H.). **Larvicides for Anti-mosquito Work, with Special Reference to Cashew-Nut Shell Oil.** [Abstract.] —*Jl. Malaria Inst. of India* (formerly *Records of the Malaria Survey of India*). 1938. June. Vol. 1. No. 2. pp. 217–219.

This is an abstract of a report of a number of laboratory experiments designed to discover a cheap and efficient mosquito larvicide. A large number of substances were submitted to experiment : the most interesting results were obtained with cashew-nut shell oil, a viscous tarry oil obtained from the charred pericarp of the nut of the fruit of *Anacardium occidentale.* The tree was originally introduced from South America. The oil is a by-product : in South India it is used by fishermen as a preservative of boats and nets. Two parts of cashew-nut shell oil and 98 parts kerosene oil killed nearly 100 per cent. of larvae and pupae of *Armigeres obturans* within two hours with a dose of 1 cc. per square foot of water surface. The dose of pure kerosene oil required to obtain similar results was from 2·5 to 3 cc. The addition of one per cent. stearic acid, dissolved in kerosene oil before mixing the cashew-nut oil with the diluent, increased the stability of the oil film. Cashew-nut shell oil as a larvicide has certain disadvantages :—the mixture must be freshly prepared for use ; oils from different sources vary in toxicity, and the oil is a skin irritant, acting as a rubefacient even when diluted for use. The authors consider, however, that its high toxicity to larvae, rapid action and low cost (one shilling and tenpence a gallon) combine to make its use worth consideration.

N. W.

Boyd (Linn J.) & Schlackman (Milton). **Malaria in Drug Addicts.** —*New York State Jl. Med.* 1938. July 1. Vol. 38. No. 13. pp. 974–976. [14 refs.]

The authors record five cases in patients aged from 22 to 42, all but one of whom were men, who were the subjects of drug addiction, though the nature of the drug is not stated. The fatality in this form

of malaria is very high being approximately 20 times the ordinary death rate in malaria. Aestivo-autumnal parasites are almost exclusively responsible for the condition, which is liable to be mistaken for diabetic coma, insulin shock and various neurological syndromes. Treatment is unsatisfactory. The authors maintain that malaria should be regarded as a possible diagnosis in the febrile syndrome of drug addicts, and that a search for evidence of drug addiction should be made in all obscure fevers. *J. D. Rolleston.*

Bulletin of the Health Organisation. (League of Nations.) 1938. Feb. Vol. 7 No. 1. pp. 43–121. With numerous illustrations.—**Experiments in Malaria Treatment and Prevention carried out in Roumania with Certain Synthetic Drugs.**

Ciuca (M.) **Foreword.** pp. 43–46.

Ciuca (M.), Ballif (L.), Chelaresco (M.) & Lavrinenko (M.). **Studies on the Treatment of Experimental Malaria Infection with Synthetic Drugs compared with Quinine Sulphate.** pp. 47–63.

Ciuca (M.), Balteanu (I.), Francke (M.), Alexa (E.) & Micu (I). **Research on the Treatment of Naturally Acquired Malaria.** (*a*) **In Hospital : Experiments to ascertain the Efficacy of Synthetic Drugs as compared with Quinine.** pp. 64–72.

Ciuca (M.), Balteanu (I.), Alexa (I.) with collaboration of V. Boeriu, I. Rugina, I. Stretcu & A. Radianov. **Treatment Experiments carried out in the Field.** pp. 73–95.

Mezincesco (D.) & Cornelson (D. A.) assisted by C. Lazar & L. Buşila. **Efficacy of Atebrin and Quinine in the Prophylactic Treatment of Malaria. (Second Memorandum.)** pp. 96–110.

Ciuca (M.), Balteanu (J.) & Alexa (L.) in collaboration with R. Balteanu, V. Boeriu & A. Radianov. **Experiments in eradicating Malaria by Means of Synthetic Drugs.** pp. 111–121.

This record of experimental work carried out in Rumania is one of the reports on which the Fourth General Report of the Malaria Commission of the League of Nations Health Organisation was based (see this *Bulletin*, 1938, Vol. 35, p. 408). It is an admirably documented report the scope of which is indicated in the list of contents above. Four schizonticides were used in these experiments, quinine, aristoquine, atebrin and acriquine, and one gametocide, plasmoquine. All three species of malaria parasite were represented among the cases treated. The conclusions that can be drawn from the experiments are summarized in the Foreword by Professor M. Ciuca. The therapeutic efficacy of quinine hydrochloride, atebrin, and acriquine in the treatment of an attack of malaria, are about equal : that of aristoquine somewhat less. Doses should not be less than 1 gm. of quinine or 0·30 gm. of atebrin a day. The length of treatment of an attack of malaria should not be less than seven days. In quartan malaria, if the parasites persist on the seventh day, the treatment may have to be prolonged, if the patient's tolerance to the drug used allows. Mixtures of different schizonticides are not recommended. A mixture of atebrin and plasmoquine should be avoided [but see Barbosa, below]. Atebrin, particularly atebrin followed by plasmoquine, is the most efficient remedy in preventing relapses of quartan and malignant tertian fevers. It is unnecessary to administer daily doses of plasmoquine in *falciparum* infections. A single dose of 0·02 gm.,

repeated every five days in the rare cases in which crescents persist, is sufficient to devitalize gametocytes. Children under one year of age do not tolerate atebrin. *N. W.*

Barbosa (Amando). Estudios sobre el poder antirrecidivante de los medicamentos antipalúdicos. [**Study of the Value of Anti-Malarial Remedies for the Prevention of Relapses.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 3. pp. 165–183. With 3 graphs.

This paper records the results of treatment of 175 persons with primary infections and of 139 persons with reinfections of *Pl. vivax*. The treatments used comprised quinine alone, in varying doses and for varying periods of time, quinine and plasmoquine, and atebrin and plasmoquine. The author concludes that in Spain the treatment of initial attacks of primary *vivax* infections, and of *vivax* reinfections, should not be prolonged more than seven or eight days. Atebrin associated with plasmoquine is much more effective than quinine or atebrin alone, or the association of these two drugs, in the prevention of relapses. Unusual symptoms ascribed to the administration of atebrin were conjunctivitis (two cases) and laryngitis (one case). Atebrin for five days followed by plasmoquine for four days also gave excellent results in *falciparum* infections. Relapses of *falciparum* infections were more frequent among children below four years of age than in later age groups. *N. W.*

Pakenham-Walsh (R.) & Rennie (A. T.). **Sulphonamides in Malaria.** —*Lancet.* 1938. July 9. p. 79. With 1 chart.

This short note concerns a patient suffering from general paralysis who was inoculated with *P. vivax*. Subsequently he was found to be suffering from cystitis, which was treated with sulphonamide preparations. This treatment appeared to cause the elimination of parasites from the peripheral blood and the cessation of rigors. Seven weeks after the eighth rigor there was a relapse of malaria which was treated with quinine. *N. W.*

Pizzillo (Giuseppe). Sulla cura di Maurizio Ascoli nelle infezioni malariche. Nota X. Studio delle infezioni primitive. [**Ascoli's Method of Treatment in Primary Infections.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 3. pp. 184–207. With 16 graphs. [71 refs.] German summary (7 lines).

This is a description of sixteen cases of malaria treated by Ascoli's method. All were recently acquired primary infections. In nine of these cases treatment was begun during the acute febrile stage of the disease. In others the beginning of the treatment was followed, after a short interval, by a return of one or more febrile attacks, the number varying inversely with the duration of the period elapsed between the onset of the primary attack and the commencement of the adrenalin therapy. Very small doses of quinine in conjunction with adrenalin treatment are sufficient to control the fever. Splenic enlargement does not occur in cases so treated ; spleens already enlarged are reduced in size. The general condition of the patient suffers but little from the infection. Febrile attacks cease altogether on the termination of the treatment or very soon after. *N. W.*

KRITCHEVSKI (I. L.). Le phénomène de renforcement en chimiothérapie. Renforcement de l'action thérapeutique des composés antimalariques de la série quinoléique. [**The Phenomenon of Increased Effect in Chemotherapy. Increased Therapeutic Effect with Antimalarial Compounds of the Quinoline Series.**]—*Ann. Inst. Pasteur.* 1938. Aug. Vol. 61. No. 2. pp. 205–216. With 6 diagrams.

The importance of the reticulo-endothelial system (R.E.S.) in the chemotherapy of malaria is pointed out by the author. When the system is blocked in certain birds by trypan blue the action of antimalarial drugs is appreciably affected, especially if used early in the infection. The integrity of function of the R.E.S. is necessary for intrinsic action by antimalarial drugs as well as for increased effect of such drugs by other compounds which themselves have no antimalarial properties.

The phenomenon of increased effect has been noted when using quinoline compounds along with trypan blue or pyrrole blue, in *P. praecox* infections, against which neither of the latter two compounds has any action. Thus plasmocide (6-methoxy-8 diethylaminopropylamino quinoline) administered in inactive doses in *P. praecox* infections of canaries, along with either of the above two compounds by injection or by mouth, exerts a therapeutic effect. Pyrrole blue when given early in treatment with maximum doses of plasmocide delayed infection for 13 days as opposed to a delay of 2 days brought about by similar doses of plasmocide given alone. The optimal dose of pyrrole blue lies between 0·0002 gm. and 0·005 gm. for a bird of 20 gm. weight. The optimal result on the infection is obtained where plasmocide is given on the third day after inoculation of the canary with *P. praecox* and is accompanied by pyrrole blue on the first two days. The components of pyrrole blue alone or together cannot bring about the increased action. An inactive quinoline compound was found to exert a therapeutic effect when accompanied by pyrrole blue, but the latter has no effect in presence of quinine or atebrin. Both trypan and pyrrole blue are deposited in the R.E.S., where it is thought they react with plasmocide to give a new compound; there is no reaction between them, however, *in vitro*. The effect of either of these two compounds is not brought about by sensitization of the organism to them, since five generations of parasites treated with pyrrole blue behaved to an inactive dose of plasmocide like fresh parasites. The same phenomenon of increased action has been described also in human malaria. *J. D. Fulton.*

DEVINE (J.). **Studies in Chemotherapy. XVIII. Changes in the Blood and Urine produced by Administration of Undecane Diamidine.**—*Ann. Trop. Med. & Parasit.* 1938. Aug. 2. Vol. 32. No. 2. pp. 163–175. [15 refs.]

A study has been made of the upper limit of dosage of undecane diamidine which may be given without serious renal or hepatic injury. Analyses were made on fasting blood samples on two successive days and on urines collected on the same days, following intravenous injection of 5 mgm. of the drug per kilo. into rabbits. There is no significant change in blood sugar, but blood urea values increased and were again normal in two days, while N.P.N. changes were smaller

in amount but with a similar trend. Anorexia and nausea caused by the drug with consequent variation of food intake makes the interpretation of the nitrogen balance difficult. The experiments were repeated with animals on half-rations to simulate the conditions in anorexia and nausea. The results were the same as above, albuminuria was absent and qualitative tests of renal or hepatic injury were negative.

Similar analyses on animals receiving successive small doses showed no significant changes. When maximum doses were given there was a transient hyperglycaemia with nitrogen retention. On histological examination the convoluted tubules of the kidneys showed degenerative changes. Lethal doses caused liver damage with hypoglycaemia and rise in amino nitrogen. Histological examination confirmed the liver damage and likewise that of kidneys. In neuro-syphilitic patients treated with well tolerated doses of this drug after induced malaria, there were no significant changes in blood or urine. Blood urea values increased with a large dose—albuminuria and glycosuria being absent. In man the blood sugar level is not affected by the maximum tolerated dose, but danger to the kidneys is indicated. The toxic action of undecane diamidine on liver and kidneys broadly resembles that due to synthalin and other alkylene diguanidines. *J. D. Fulton.*

WHITE (R. Senior). **On Malaria Transmission in the Jeypore Hills. Part II. A Second Year's Results.**—*Jl. Malaria Inst. of India* (formerly *Records of the Malaria Survey of India*). 1938. June. Vol. 1. No. 2. pp. 129–145. [10 refs.]

Part I of this paper (see this *Bulletin*, 1937, Vol. 34, p. 627) reported that Anopheles of the *funestus* group, *fluviatilis*, *varuna* and *minimus*, were responsible for malaria transmission in the Jeypore Hills, and that *A. culicifacies*, which is very prevalent, is of no pathogenic importance. A second year's work has fully confirmed these findings. Anopheles control limited to the *funestus* group has not resulted in any deterioration of health of the imported railway staff: it has, however, effected a 78 per cent. saving in expenditure on larvicides. Catches of adult females in dwelling houses were repeated throughout a year. Of the total caught *A. culicifacies* contributed 38·5 per cent., *funestus* 58·1, and *jeyporiensis* 3·4, as compared with 60·2, 4·1 and 35·7, respectively, in cattle sheds. Pig-sties offer no attraction as a resting place to any of the twenty-three species of anophelines found locally.

The second year's dissections gave oöcyst and sporozoite rates as follows: *culicifacies* 0·08 and 0; *fluviatilis* 6·8 and 3; *varuna* 8·9 and 4, and *minimus* 5·1 and 4·1. Oöcyst counts are given for the three transmitting species. The counts were low; three-quarters of them had less than six oöcysts per stomach. There is a paucity of crescents in blood films in the Jeypore Hills. Observations with a human bait trap-net led to the conclusion that each inhabitant of the village in question would receive four infected bites in September, seventeen in October and fifteen in November. *N. W.*

WHITE (R. Senior) & DAS (B. K.). **On Malaria Transmission in the Singhbhum Hills.**—*Jl. Malaria Inst. of India* (formerly *Records of the Malaria Survey of India*). 1938. June. Vol. 1. No. 2. pp. 169–184. With 1 fig.

The Singhbhum Hills separated from the Bay of Bengal by the Orissa Plain comprise the British Indian District of the same name

and three Indian Feudatory States. The higher hills exceed 3,000 feet. The hills contain the chief iron ore deposits of India. The district is intensely malarious. It was formerly believed that *A. culicifacies*, which is very prevalent, was a vector of importance. The observations recorded in this paper indicate that, as in the Jeypore Hills, anophelines of the *funestus* group, *fluviatilis*, *varuna* and *minimus*, are much the most important vectors, the only ones that " require control to afford malaria protection." Of 1,611 *A. culicifacies* dissected the oöcyst rate was 0·3 and the sporozoite rate zero : of 1,031 *A. fluviatilis* these rates were 4·6 and 1·8 ; of 189 *A. varuna*, 4·2 and 1·1, and of 334 *A. minimus* 6·9 and 3·9. Transmission of malaria was found to occur throughout the year except in May, June and July. *N. W.*

Sinton (J. A.) & Shute (P. G.). **A Report on the Longevity of Mosquitoes in Relation to the Transmission of Malaria in Nature.**— *Ministry of Health. Reports on Public Health & Med. Subjects No. 85.* pp. iv+45. With 2 charts. [69 refs.] 1938. London : H.M.S.O. [9*d.*]

It is evident that the length of life of an adult *Anopheles* may affect its power of transmitting malaria. An insect may normally live so short a time, at least under certain climatic conditions, as to prevent the Plasmodium developing to the sporozoite stage in it. The authors review our present knowledge of longevity and contribute their own material.

The insect's length of life is influenced by a great variety of factors. Some are internal, such as the nutrition of the larva (not discussed here), the rate of metabolism of the adult and its preparation for egg-laying or hibernation. There are many external factors also, of which we believe that temperature and humidity are the most important. Our knowledge of these subjects is at present fragmentary, and much of the earlier work was carried out under difficult conditions and cannot be regarded as satisfactory. The authors summarize these subjects, but it is not easy to present a concise résumé of them. Till much more is known about metabolism and the effects of climate it will hardly be possible to consider the " natural span of life," *i.e.*, the normal length of life under favourable conditions.

In discussing the possible effect of Plasmodium on the length of life of Anopheles the authors point out that it does not produce gross lesions in the tissues. The parasite seems to provoke no histological reaction, except that when salivary glands are heavily infected they become altered in shape and very friable. There is a considerable body of opinion that even a heavy infection does not reduce the insect's length of life (but apparently no previous author has devised experiments in order to investigate this point). The authors' very great experience, mainly based on *A. maculipennis*, supports the view that the parasite is harmless to the mosquito. They have also performed a number of controlled experiments, which are set out in full ; of these one may be quoted. A number of *A. maculipennis atroparvus* were collected in nature in November, a season when the insects are not using food to develop ovaries. They were divided into two groups, one of which was fed on a clean man, the other on a carrier of *P. vivax*. Both groups were then kept at 75°F. (24°C.) and a high humidity, having daily an opportunity of feeding on a rabbit. No differences were observed in the mortality, either in the first 8 days, the period during

which the oökinetes penetrate the gut wall, or later. There is reason for thinking that all or nearly all the mosquitoes which had fed on the infected man had acquired the infection. Such experiments as these show clearly that neither *P. vivax* nor *falciparum* shortens the life of *atroparvus*; this is shown by experiments under various conditions of maintenance, all of which might be described as "favourable." But there is some evidence that under "unfavourable" conditions, for instance partial starvation, infection with Plasmodium tends to shorten life. The authors refer to certain carefully controlled experiments with *Culex fatigans* and *Proteosoma* in which a significantly higher mortality was observed among infected mosquitoes (see this *Bulletin*, 1936, Vol. 33, p. 278); in these experiments the conditions were unfavourable and the view is put forward that the results are not applicable to what occurs in nature.

In general the authors hold that death from infection with Plasmodium is not mainly responsible for the fact that certain species of Anopheles seldom transmit malaria in nature. *P. A. Buxton.*

PERAGALLO (Italo). Un catturatore trasparente delle zanzare. [**A Transparent Trap for Mosquitoes.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 3. pp. 231–234. With 1 fig. French summary (4 lines).

The author figures and describes a small piece of apparatus for the capture of mosquitoes. It consists of two cup-shaped receptacles, each 100 mm. in diameter, mounted at right angles to each other at the end of a rod. Each receptacle contains a plug of cotton-wool impregnated with petroleum. The apparatus is constructed of acetyl-cellulose and so is transparent and unbreakable. *N. W.*

YELLOW FEVER.

Précis of Abstracts in this Section.

A table is given by James (p. 19) showing the distribution of yellow fever in South America and Africa for the 6 months ending 31.3.1938. The epidemiological value of the protection test is shown, and it is now being used in Uganda and the Sudan. Attenuated neurotropic virus in homologous serum was used for immunization, with good results. Jaundice following vaccination is probably due to a filterable virus contaminating the serum used or possibly cultivated with the yellow fever virus. The development of antibodies is slow after vaccination, but they persist in full strength for at least one year. Soper (p. 20) records that pantropic virus (17 D) cultivated on fowl embryo tissue, from which the brain and spinal cord have been removed to prevent neurotropism, has been used since 1934 for the vaccination of 168,000 persons in Brazil. The method of preparation is described. No serious ill effects have been seen, and immunity was complete in 42 of 45 persons tested for it. Viscerotomy is essential in detecting early cases in an epidemic. Bauer (p. 20) states that jungle yellow fever may cause well marked epidemics, but the method of transmission is still obscure. Monkeys, however, probably constitute the most important factor in the spread of this disease, according to Soper (p. 20).

Sorel (p. 21) notes that yellow fever has increased in the French Colonies, and O'Brien (p. 21) analyses an outbreak in British West Africa. Crouch (p. 21) describes a few protection tests found to be positive in cases of febrile jaundice in Malakal, where, however, *Aëdes* are scarce. Schüffner *et al.* (p. 22) discuss the finding that in spite of the absence of yellow fever from Surinam since 1908, 11 per cent. of 233 persons living there since that date were found to give positive protection tests. A description of an outbreak at Zongo is given by van Campenhout (p. 22). The effects produced by Laigret's method of vaccination are described. The value of the mouse protection test in epidemics of uncertain nature is indicated, and its limitations stated, by the Commission (p. 23). Mass vaccination is the only practical method of prophylaxis in the jungle population.

Dinger (p. 23) discusses possible measures against yellow fever in the Dutch East Indies. Clerc (p. 24), in discussing the epidemic on board the "Sea Rambler," considers that there are arguments against its having been yellow fever though the laboratory tests were very strongly in favour of it. Schüffner, Walch-Sordrager and Hoekstra (p. 25) consider that jungle yellow fever in Surinam is epizootic and transmissible to man, in whom it is a slight or masked infection, different in clinical form from yellow fever. Patiño Camargo (p. 25) notes that cases of yellow fever and "influenza" occurred simultaneously in Guadeloupe in 1929. It is not possible to say how many of the "influenza" cases were really yellow fever. He details the vectors of Colombia. Aragão (p. 26) describes a small outbreak in São Paulo.

Shannon, Whitman and Franca (p. 27) found that *Aëdes leucocelaenus* and *Haemagogus capricorni* were the only two species which were infective by bite and which were thus incriminated as natural vectors among 24,304 wild mosquitoes of some 30 different species

caught alive at points near where human infection had occurred in an outbreak of jungle yellow fever, but an emulsion of 88 Sabethines caught in the same neighbourhood as the infected *Haemagogus* and injected intracerebrally into mice produced yellow fever encephalitis. KUMM and NOVIS (p. 28) studied the habits of 80 species from a jungle yellow fever area. LINS (p. 28) describes a fatal case of jungle yellow fever. The "larval index" of *Aedes aegypti* in various parts of Africa is mentioned on page 28.

TIBIRIÇÁ (p. 29) gives a full account of the microscopical appearances of the liver in yellow fever, and DA ROCHA LIMA points out that the evidence provided by a number of changes in the cells must be considered in making a diagnosis.

FINDLAY and MACCALLUM (p. 30) found that 89 cases of jaundice occurred in 3,100 persons vaccinated with virus and immune serum. They think it to be due either to a hepatotoxic virus in the inoculum or a combination of hepatotoxic substance and an infective agent, probably that of common infective hepatic jaundice [see also above, JAMES]. LEFÈVRE and CAMBESSÉDÈS (p. 30) describe methods of vaccination. LLOYD (p. 31) calls attention to the difficulty of the diagnosis of yellow fever in specimens obtained by viscerotomy, and suggests that the diagnosis should be checked by blood surveys. The necessity for anti-mosquito measures and vaccination in endemic areas is stressed by BARTHAS (p. 31).

MACKIE and CRABTREE (p. 32) give an account of a method of disinfestation of aircraft by means of spray and nebulizer, using a watery base pyrethrum insecticide.

SALEUN, CECCALDI and PALINACCI (p. 32) describe the isolation, for the first time, of a strain of yellow fever virus in the French Congo. It was found to be indistinguishable from the Dakar strain. DE ASSUMPÇÃO (p. 33) shows the essential identity of a strain of the jungle yellow fever virus isolated in São Paulo, and a Dakar neurotropic strain, though the São Paulo strain was apparently slightly less virulent than the other. *C. W.*

i. JAMES (S. P.). Renseignements sur la fièvre jaune reçus au cours des six mois écoulés jusqu'au 31 mars 1938. [**Information on Yellow Fever received during the Six Months ending March 31st, 1938.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. June. Vol. 30. No. 6. pp. 1197–1204.

ii. SOPER (Fred L.). Situation de la fièvre jaune au Brésil. [**The Yellow Fever Position in Brazil.**]—*Ibid.* pp. 1205–1208.

iii. SOREL (F. P. J.). Les cas de fièvre jaune dans les colonies françaises en 1937. [**Yellow Fever Cases in French Colonies during 1937.**]—*Ibid.* pp. 1209–1217.

iv. O'BRIEN (A. J. R.). La fièvre jaune en Nigeria et Gold Coast en 1937. [**Yellow Fever in Nigeria and Gold Coast during 1937.**]—*Ibid.* pp. 1218–1222.

v. CROUCH (H. A.). Sur la situation de la fièvre jaune à Malakal, province du Haut-Nil, au Soudan. [**The Yellow Fever Position in Malakal, Upper Nile Province, Sudan.**]—*Ibid.* pp. 1223–1227.

vi. SCHÜFFNER, WALCH-SORGDRAGER & HOEKSTRA (M.). Sur la persistance de la fièvre jaune en Guyane Hollandaise, démontrée par le test de protection de la souris. [**The Persistence of Yellow Fever in Dutch Guiana, demonstrated by the Mouse Protection Test.**]—*Ibid.* pp. 1228–1236. With 2 figs.

vii. VAN CAMPENHOUT (J.). Sur une épidémie suspecte d'être due à la fièvre jaune survenue à Zongo (Congo Belge). [**A Suspected Epidemic of Yellow Fever occurring at Zongo (Belgian Congo).**]—*Ibid.* pp. 1237–1241.

viii. ——. Enquête de protection amarile au Ruanda-Urundi. [**An Inquiry of Yellow Fever Protection in Ruanda-Urundi.**]—*Ibid.* p. 1242.

ix. BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. 1938. June. Vol. 30. No. 6. pp. 1243–1245.—Rapport de la commission de la fièvre jaune. [**Report of the Yellow Fever Commission.**]

i. The number of cases of yellow fever notified during the six months ending 31st March, 1938, are indicated in the following table :—

South America.

Country	State	No. of localities with cases	No. of cases	No. of deaths
Brazil	Miñas Geraes ...	31	—	100
	Pará	1	1	1
	Santa Catharina	1	1	1
	Rio de Janeiro ...	10	19	16
	São Paulo ...	1	14	—
	District Federal	2	2	2
	Cayua	1	12	3
Colombia	... ...	5	9	9
Paraguay ...	... ...	1 (Asuncion)	1	1

Africa.

Belgian Congo ...	... ...	2	16	10
French West Africa—	Dahomey ...	1	5	—
	Ivory Coast ...	5	6	4
	Senegal	13	29	21
	Soudan	2	3	3
French Equatorial Africa	Oubangui-Chari	1	1	1
British West Africa	Gold Coast ...	13	18	12
	Nigeria	6	8	6

These figures do not differ markedly from those of the preceding six months, but fewer cases have been notified from towns, the majority coming from villages or rural districts with a high larval index.

With reference to epidemiology, attention is called to additional evidence in support of the value of the protection test in mice as an indication of the distribution of the disease. At Entebbe, Uganda, the Government is helping the Rockefeller Foundation to investigate the nature of fevers of unknown origin by inoculating the blood of patients into mice. This inquiry is in progress in the regions west of the Nile, in the Uganda forest, in the Ruwenzori district, and in the south of the Anglo-Egyptian Sudan.

Immunization is now being carried out by a single inoculation of neurotropic virus attenuated by culture, suspended in 0·25 to 0·5 cc. homologous serum. Dr. Sawyer reports that since 1st January 1937, in Brazil, 80,000 persons have been vaccinated by this method, without any complications being observed. Dr. Findlay records that in London during the past five and a half years 4,300 Europeans have been vaccinated before proceeding to yellow fever countries, and not a single case of the disease has occurred among them. During this same period some 30 Europeans in these areas became infected, none of whom had been vaccinated. Col. Mackie reports that the regulations now require the vaccination of all Government servants serving in British West Africa, and the R.A.F. applies similar rules for those serving in yellow fever districts.

Attention is called to the occurrence of jaundice following yellow fever vaccination noted by FINDLAY and MACCALLUM [see this *Bulletin*, 1938, Vol. 35, 119] who found that 2·9 per cent. out of 4,300 had shown this symptom. Col. Mackie records 6 per cent. out of 54 R.A.F. personnel. The cause of this jaundice is supposed to be a filterable virus inoculated with the serum, and it may have been cultivated in association with the yellow fever virus, since recently Findlay has used a new strain of culture virus for 1,100 vaccinations without any of the patients developing this symptom.

An interesting letter from Dr. J. H. BAUER giving supplementary notes on yellow fever in Brazil is reproduced. It confirms the view that jungle yellow fever may cause well marked epidemics. Its method of transmission, however, still remains obscure. Evidence of its spread is afforded by the occurrence of fatal cases in middle-aged persons who had been born and lived all their lives in the same locality.

Since last summer more than 200,000 persons in Brazil alone have been vaccinated by the method described above. Ninety per cent. have shown no reaction whatever, and in the remaining 10 per cent. reactions of varying intensity have occurred, generally on the 6–8th day after inoculation. There has not been a single death nor any other complication such as jaundice.

The examination about a month later of the serum of vaccinated subjects showed the existence of immune bodies in at least 95 per cent. of the patients, but it would seem that the development of antibodies is rather slow and may go on increasing for about three months. Patients examined a year later showed no diminution in the degree of immunity.

ii. Details are given of yellow fever vaccination in Brazil. A pantropic virus known as " 17D " which had been cultivated on fowl embryo tissue since 1934 by Wray LLOYD [see this *Bulletin*, 1936, Vol. 33, 623] has been used since February, 1937. During 1937, 38,387 persons in Brazil were vaccinated with this virus, and by the end of March 1938, the number had reached 168,000. Among the first 200 persons vaccinated at Rio de Janeiro, about 20 per cent. showed symptoms attributed to the virus, but in no case were they sufficient to necessitate stopping work. In 12 out of 29 patients carefully examined, small quantities of virus were found to be present in the blood for one day or more, between the 4th and 10 days after inoculation. Out of 45 examined later for immunity, 42 gave complete protection, one partial, and 2 were negative. Of the latter, one patient had shown no immunity reaction after inoculation with another virus, and the other had received only a very small dose of virus.

The virus used for inoculation is prepared by injecting the tissue culture strain into fowl embryos within the egg shell. After incubating these eggs for some days a higher concentration of virus is obtained than in tissue cultures. The embryos are then ground up in normal human serum to make a 10 per cent. suspension, which is dried and stored in ampoules. It is essential that the virus should be living when used for vaccination and although the dried virus will live for long periods at low temperatures it is advisable to test the batches before use, as a case occurred in which the virus had become inactive. No cases of jaundice have been observed in inoculated subjects, nor any other serious after-effects within a year of vaccination.

With reference to yellow fever in South America, recent observations show the very great importance of the jungle form of the disease which is evidently widely distributed. Viscerotomy is found to be invaluable, and the early cases of recent outbreaks were all discovered by this method. The present outbreak in the States of Miñas Geraes and Rio de Janeiro has been associated, like many others, with an increased mortality among the howler monkeys, and protection tests on numerous wild animals support the view that various species of monkeys constitute probably the most important factor in the spread of jungle yellow fever.

iii. During 1937, there has been a distinct increase in the number of cases of yellow fever recorded from French Colonies. A total of 48, including 40 from West Africa, 1 from the Cameroons and 7 from Equatorial Africa, is reported. Forty-four of the cases were fatal, including 23 Europeans, 18 Syrians and 3 natives. The diagnosis was confirmed in 43 cases by histological examination of the liver. Interesting details of these cases are given including their clinical histories and distribution. Two of the patients had been vaccinated against yellow fever [presumably by Laigret's method], one only four days and the other about eighteen months before the appearance of symptoms of the disease. The author recommends testing the blood of vaccinated subjects one month after inoculation to determine the degree of immunity acquired and a year later to test its persistence.

iv. An analysis of cases of yellow fever occurring in Nigeria and the Gold Coast during 1937. Of the 81 from the Gold Coast, 68 occurred in the Eastern, 6 in the Western, and 3 in the Central Province, and 4 in the Northern Territories.

The main characteristic of this outbreak has been the mortality among Africans, 74 cases with 65 deaths, including an infant aged only three months. In addition there were four cases, all fatal, among Syrians, and three cases, all fatal, among Europeans. The majority of the deaths occurred about the fifth day of the disease, and intranuclear inclusions were easily found in all the livers examined, although in previous cases they had not been found. The principal factor for the concentration of cases in the Eastern Province seems to be the water stores in the rural districts, and the necessity of preserving every available drop of water.

v. During 1933, protection tests were made on 50 sera in Malakal; only one of these sera, from an adult, was positive. At the end of 1935 a fatal case, suggestive of yellow fever, occurred in a man from Eliri, in the Nubian Mountains, and the results of protection tests on 27 sera from that region gave 12 positive and 15 negative. During 1936, out of 10 sera from cases of febrile jaundice in Malakal, one was

positive. During 1937, 12 cases of febrile jaundice occurred there ; 4 out of 11 examined gave positive protection tests in mice. Clinical details are given of these 4 cases, all of whom recovered. With reference to the occurrence of *Aëdes aegypti* at Malakal, during 1937, 124,241 inspections were carried out and only 5 adult mosquitoes and 14 cases of larval infection were found. During the last quarter, when two suspected cases of yellow fever occurred, no *Aëdes* were found. As a precautionary measure the aerodrome at Malakal has been considered as situated in an infected zone, and the usual anti-yellow fever methods applied.

vi. The last two epidemics of yellow fever in Paramaribo, Surinam, occurred in 1902 and 1908, since when no case has been recorded. The authors have carried out protection tests in mice with the sera of 369 persons from Surinam and the results are divided according as to whether the subject lived there before 1908 or since then.

Of those living in Paramaribo before 1908, 34 out of 60 were positive, compared with 25 out of 233 of those living there since that date. This latter figure of 11 per cent. is rather surprising in view of the absence of any records of the disease and suggests the occurrence of small epidemics. Of those living in the interior, including Indians and forest negroes, the percentage infected has remained the same (16 per cent.) whether they were born before 1908 or since then. Three out of 19 were positive in the former group and 9 out of 57 in the latter. Only 1 female out of 25 was positive compared with 8 males out of 35 examined.

Finally, the authors give the results of protection tests carried out on the members of the staff of the yellow fever laboratory in Amsterdam. Out of 6 persons coming into daily contact with the virus, 4 were positive and 2 negative. Out of 10 persons rarely coming in contact with the virus only one gave a positive protection test.

In addition 95 inhabitants of the Netherlands, who had never been exposed to the chance of infection, were examined and all were negative.

vii. The description of an outbreak at Zongo on the Oubangui involving 17 cases with 9 deaths. The symptoms included headache, pain in the joints, liver and epigastric region ; mucous vomits ; slight jaundice ; the urine containing numerous cylindrical casts ; and typhoid state, with terminal delirium. Two mice inoculated with the serum of a patient died with paralysis on the fifth day. The livers of four of the patients did not show lesions characteristic of yellow fever, and out of seven sera only one gave a positive protection test, and since 29 per cent. of the general population were positive in 1935, this single positive is considered of no significance. However, precautionary measures were taken against it being a modified form of yellow fever, especially in view of the fact that in the French territory on the other side of the river, yellow fever lesions were found in the liver of a patient who died with similar symptoms.

The author gives the results of using Laigret's method of vaccination in 30 Europeans ; 10 had slight reactions and needed rest ; 13 severe reactions about the 6th day lasting for 3 days ; 5 serious reactions on the 14th day lasting for 10 days ; and 2, severe reactions from the 21st day onwards. Meningeal symptoms, with violent headaches and frequent vomiting, were present in the severe cases. The reactions in

natives were generally much less severe, but cases occurred which necessitated hospitalization of the subjects.

viii. An examination of 50 sera from natives of this region by the mouse protection test gave 49 negative and 1 positive.

ix. The Commission directed its attention to five main points. (*a*) With reference to the value of the mouse protection test for the diagnosis of yellow fever, it is not recommended for the diagnosis of doubtful febrile disease with clinical signs of yellow fever. It is only of real value for making a retrospective diagnosis in a community suffering from an epidemic of uncertain nature, when the number of positives is well above that of the surrounding population, and where previously negative persons become positive after recovery. (*b*) It is suggested from laboratory experiments that a virus not attenuated by prolonged culture may occur in the peripheral circulation and be transmitted by a mosquito feeding on such blood. On the other hand cultured virus, such as strain "17D" in Brazil, has a very attenuated virulence, and experimental attempts to transmit the virus by mosquito have been negative. (*c*) With regard to the use of prophylactic vaccination against jungle yellow fever, mass vaccination is now recommended in view of the new methods of preparing vaccine, and at present this would seem to be the only practical means of anti-yellow fever prophylaxis among the jungle population. This recommendation only relates to the jungle form and does not in any way imply the abandonment of other preventive methods in urban districts. (*d*) It is considered desirable that before use each batch of vaccine should undergo a test for vitality and titration of virulence, and that vaccinated persons should be tested for immunity not earlier than one month after vaccination. It is not at present possible to fix any period for the duration of this immunity.

E. Hindle.

Dinger (J. E.). Nieuwere inzichten omtrent de epidemiologie en bestrijding der gele koorts en hunne beteekenis voor Nederlandsch-Indië. [**Significance of Present Knowledge of Yellow Fever for Netherlands India.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. May 31. Vol. 78. No. 22. pp. 1292–1310. [55 refs.]

A detailed, full, introduction presents the facts that are known of the distribution of yellow fever. Then comes the question: What importance have these known facts for Netherlands India? Much turns here upon the mouse test, which has revealed the existence, in latent subclinical form, of yellow fever not only on the west coast of Africa but also in the whole of equatorial Africa. The danger which suggests itself is that with the development of air travel endemic areas will be rapidly connected up with air ports, such as Nairobi for example on the Cape-Cairo route. Anti-yellow fever landing places are already being set up at Juba and Malakal by the Anglo-Egyptian authorities. Those countries which adhered to the regulations of the International Air Convention are now likely to be faced with difficulty over the interpretation of the words "biologically recognizable form" of yellow fever. An attempt has been made to deny the specificity of the mouse tests, which are biological tests, but the great majority of hygienists recognize their specific validity.

What, it is asked, should be done in the matter by the Netherlands Indies Government? Can the quarantine regulations be rendered

more stringent? Mouse tests are scarcely possible as they require the use of yellow fever virus and the importation of this virus is banned by law. Vaccination on a large scale could scarcely be considered unless the menace of yellow fever became acute. This procedure moreover comes under the same ban as applies to the mouse test. Again, it is not even thinkable than an anti-*Aëdes* campaign should be commenced. What seems feasible and called for is to make preparations for such a campaign by special surveys of breeding places of *Aëdes*. Regulations should at least be drafted to meet the necessity for action when it arises. *W. F. Harvey.*

CLERC (Marcel). L'épidémie de fièvre jaune du "Sea Rambler" (1936). [**The Epidemic of Yellow Fever in the "Sea Rambler" (1936).**]—*Rev. Méd. et Hyg. Trop.* 1937. Nov.–Dec. Vol. 29. No. 6. pp. 281–292.

A discussion of the epidemic on board the "Sea Rambler" in 1936, which was diagnosed as yellow fever by Dr. P. G. STOCK [see this *Bulletin*, 1937, Vol. 34, p. 683].

It may be recalled that this epidemic broke out among a crew of 24 about a week after the ship had left Dakar, but previously had been for two weeks in Kaolakh and Zighinchor below Gambia, where mosquitoes were said to be very troublesome when loading cargo before returning to Dakar. On arrival at Madeira, various members of the crew became ill, and at Funchal the port authorities considered it an outbreak of food poisoning. Seven of the crew died, five remained in hospital at Madeira and two of the original crew, who had been ill, remained on the ship; eight new men were recruited at Madeira and the ship returned to Sunderland.

An investigation of this epidemic was made by the port authorities. Dr. FINDLAY examined the blood of 14 of the crew. Six gave positive mouse protection tests against yellow fever, including four of the crew hospitalized at Madeira and the two patients who remained on duty, whilst the eight new members of the crew recruited in Madeira all gave negative tests. Agglutination tests against *S. icterohaemorrhagiae*, made by Major H. C. BROWN, gave negative results with all the sera examined, thus excluding the possibility of Weil's Disease. Agglutination tests were also made to exclude *Salmonella* infection. Finally, the blood of two patients was examined for malaria parasites, also with negative results.

In spite of these strong arguments the author is of the opinion that there are certain arguments against the diagnosis of yellow fever.

All the cases occurred within eight days, and therefore one must assume that they were bitten by infected mosquitoes at more or less the same time. But there were no subsequent cases, although one might have expected some of the mosquitoes on the ship to have become infected by feeding on the patients and thus to produce a new series of cases after the usual incubation period. A much more serious objection is the absence for many months previously of any notifications of yellow fever from the localities visited by the "Sea Rambler," and the fact that no other ships from these localities have records of similar outbreaks. On the other hand cases of malaria are common on ships returning from the west coast of Africa and details are given of serious outbreaks among crews, causing the deaths of several members.

The complete absence of "black vomit" among the cases on the "Sea Rambler" is also noteworthy, since all the described symptoms exist in other diseases and especially malaria. The laboratory tests, however, would seem to provide overwhelming evidence in support of the diagnosis of yellow fever.

In the discussion following this paper Boyé disputed the value of the mouse-protection test and rejected the diagnosis of yellow fever because of the absence of "black vomit." Stefanopoulo, whilst admitting that no serological reaction is absolutely infallible, stated that the results of serum protection tests for the diagnosis of yellow fever had been of great value and could not be ignored even if in certain cases the results seemed open to question. *E. H.*

Schüffner (W.), Walch-Sordrager (B.) & Hoekstra (J.). Laatste resultaten van het onderzoek naar het voorkomen van Gele Koorts in Suriname. [**The Occurrence of Yellow Fever in Surinam.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. Mar. 15. Vol. 78. No. 11. pp. 571–592.

Two epidemics of yellow fever have occurred in this century in Paramaribo, the capital of Dutch Guiana on the Surinam River, one in 1902 and the other in 1908. It is well known that the immunity after yellow fever may be taken to be life-long. Now that we have in the mouse a method of testing this immunity, it became possible to estimate what permanent effect epidemics had left upon the population of Surinam. It was found that 56 per cent. of the people had a serum which was strongly protective for mice. In the same age group of Indians and bush negroes, among whom no epidemic had occurred, a 16 per cent. immunity was demonstrated. This immunity is placed to the account of the "jungle" form of yellow fever. No distinction is found between jungle fever and the classical fever so far as relates to pathological anatomy and serology, but a reservation is made regarding the clinical manifestations. In these matters the authors agree more or less closely with the American workers. Jungle fever is not a serious disease and it would seem that it can easily be overlooked. This explanation is forthcoming for the existence of immunity among jungle folk. But what of the immunity found to exist in the people of younger age in Paramaribo and district? No epidemic is recorded which could have affected them or account for their 11 per cent. immunity (reduced to 5·6 per cent. with more stringent test). A lengthy argument centres round this immunity and other points in the text and the conclusion is drawn that it can only be due to a jungle type of the fever. This jungle type is to be regarded as being an epizootic and as capable of transmission to man, in whom it is a slight or masked infection. Nothing is yet known regarding the nature of the enzootic. *W. F. Harvey.*

Patiño Camargo (Luis). Notas sobre fiebre amarilla en Colombia. [**Yellow Fever in Colombia.**]—Reprinted from *Rev. Facul. de Med. de Bogotá.* 1937. Nov. Vol. 6. No. 5. 74 pp. With 4 maps. [115 refs.]

The author in the opening sections of this article gives a general account of yellow fever, its source and early outbreaks, applying it locally to Colombia. To readers of this *Bulletin* important parts are

those giving the dates of outbreaks of which 45 are listed between 1830 and 1900 and another 23 between 1900 and 1929. In the table of the first information is given of nine only and that is very meagre, a statement being made of the duration of the outbreak, the population and the mortality, in seven the actual figures, in two the percentages only [presumably case mortality]. In the second table of twenty-three, ten places are mentioned as being free from *Aëdes aegypti* and in two others they were "very scarce" and the outbreaks were very likely of the rural type. FRANCO, MARTINEZ and TORO concluded that the Muzo outbreak of 1907 was a mixture of yellow fever and leptospirosis (*icterohaemorrhagiae*). In the Socorro outbreak (Santander) of 1929 there were 150 cases, 100 mild, 50 severe and 37 died. In Guadaloupe, adjacent to Socorro, cases occurred in January and February, some being diagnosed as influenza. This outbreak was studied by PEÑA CHAVARRIA, SERPA and BEVIER and they came to the conclusion that a certain number definitely suffered from yellow fever but they are unable to say how many, or what proportion of the "influenza" cases were cases of yellow fever.

The author states that vectors, conveying the infection in Colombia by their bite, are five, namely *Aëdes aegypti*, *Aëdes scapularis*, *Aëdes taeniorhynchus*, *Aëdes fluviatilis* and *Culex fatigans* (this occasionally transmits but more often fails). Others are infective if the triturated bodies are inoculated into *M. rhesus*: *Aëdes serratus*, *Aëdes terrens*, *Psorophora cingulata*, *P. ferox*, *Mansonia fasciolata*, *M. chrysonotum*, *M. titillans* and *Culex fatigans*. A list of 117 species of mosquitoes found in Colombia is also given. The *Aëdes aegypti* index varies greatly in a district. Thus, in Cúcuta in 1923 it was 90 per cent., in 1932 none was found; in Bucaramanga in 1923 it was 86 per cent., in 1932 nil; in Barranquilla in 1923, 51 per cent., in 1932, 72 per cent.; in Santa Marta 64 and 17 per cent. in 1923 and 1932 respectively.

The article ends with a sketch of the measures taken by the National Department of Hygiene co-operating with the staff of the Rockefeller Foundation and recommendations, both on the usual lines of examining samples of blood for the protection test, viscerotome sections, epidemiological and entomological studies, vaccination and determination by spot maps of distribution and so forth. *H. H. S.*

ARAGÃO (Henrique de Beaurepaire). Observações a respeito de um foco limitado de febre amarella sylvestre no estado de S. Paulo. [**A Limited Focus of Rural Yellow Fever in the State of São Paulo.**]—*Brasil-Medico.* 1938. Apr. 23. Vol. 52. No. 17. pp. 401–412. With 1 map.

The locality affected is in the municipalities of Presidente Wenceslau and Sante Anastacio, some 870 kilometres from São Paulo and 400 metres above sea level. Between 14th December, 1937, and 8th February, 1938, there were twenty-one cases, four of them fatal. The diagnosis was made on clinical, epidemiological and serological grounds, and by examination of the liver in the fatal cases. The serological tests comprised inoculation into white mice and *rhesus* monkeys. Anti-amaryl vaccinations were performed on the inhabitants; between the 14th and 25th January, 7,784 in Presidente Wenceslau and on the 28th January, 315 in Sante Anastacio. None showed any untoward symptoms worthy of note after the inoculations; a few had a transient

rise of temperature, malaise and nausea. During the time of vaccination two cases occurred in the unvaccinated, and a week after vaccinations ceased another case occurred, a man who had been away and had not been vaccinated. A map of the district is reproduced in the article, but on so reduced a scale as to be undecipherable. A list of the mosquitoes caught in the district is given and includes *Aëdes serratus, scapularis, fulvus* and *leucocelaenus*. *H. H. S.*

VASSILIADIS (P. Ch.). Épidémiologie de la fièvre jaune telle qu'elle se présente actuellement. [**The Present Epidemiology of Yellow Fever.**]—*C. R. Soc. Méd. et Hyg. Trop. d'Egypte.* Alexandria. 1936–1937. 8th Year. pp. 43–55.

A general review of the subject. *E. H.*

SHANNON (R. C.), WHITMAN (Loring) & FRANCA (Mario). **Yellow Fever Virus in Jungle Mosquitoes.**—*Science.* 1938. July 29. Vol. 88. No. 2274. pp. 110–111.

During the 1938 outbreak of jungle yellow fever in the state of Rio de Janeiro the authors had mosquitoes collected from points where human infection had occurred and forwarded daily to the laboratory at the capital.

Out of 24,304 wild mosquitoes sent in during a period of eleven weeks yellow fever infection was produced in two monkeys by the bites of *Aëdes leucocelaenus* (Dyar and Shannon), and *Haemagogus capricorni* (Lutz) respectively. The mosquitoes tested are indicated in the following table :—

List of Wild-caught Mosquitoes Tested for the Presence of Yellow Fever Virus.

Group	Species	Used	Fed	Remarks
1	*Aëdes scapularis* (Rondani) ...	180	100	
2	*A. leucocelaenus* (Dyar and Shannon)	4,671	2,270	Positive by bite.
3	*Haemagogus capricorni* (Lutz)	1,216	646	„ „
4	*Psorophora ferox*	253	143	
	P. albipes	15	7	
	A. fulvus (Wiedemann) ...	8	5	
	A. serratus (Theobald) ...	1,570	545	
	A. terrens (Walker)	503	58	
5	*Sabethes*, 3 species	1,092	369	
6	All other sabethines (*Sabethoides, Limatus, Wyeomyia, Goeldia* and *Trichoprosopon* (*Joblotia*), totalling about 20 species	14,796	3,443	Positive by injection.

In addition to the positive results obtained in the feeding experiments, which prove that these two species of forest-inhabiting mosquitoes are natural vectors of yellow fever, the intracerebral injection of fluid from an emulsion of 118 *Haemagogus capricorni* into mice produced typical yellow fever encephalitis, and similarly positive

results were obtained by the inoculation of 88 specimens of Sabethine mosquitoes. These results are of very great interest, as constituting the first definite evidence as to the species concerned in the natural transmission of jungle yellow fever in Brazil. *E. H.*

Kumm (H. W.) & Novis (Oswaldo). **Mosquito Studies on the Ilha de Marajó, Pará, Brazil.**—*Amer. Jl. Hyg.* 1938. May. Vol. 27. No. 3. pp. 498–515. With 2 maps, 1 graph & 2 plates. [11 refs.]

A total of 10,121 adult mosquitoes and 1,260 larvae, representing 80 different species, were collected in an area where jungle yellow fever was known to have occurred. No specimens of *Aëdes aegypti* were found. The most common species biting man by day in the forests were *Aëdes nubilus*, *Psorophora ferox* and *Haemagogus janthinomys*. The daily curves of activity of these three species showed significant differences, *Aëdes* being predominantly crepuscular, *Haemagogus* occurring especially about noon, and *Psorophora* showing both morning and afternoon peaks of activity. Wide variations were found in the abundance and variety of mosquitoes occurring in the two main types of forest in this region. *E. H.*

Bulletin de l'Office International d'Hygiène Publique. 1938. Sept. Vol. 30. No. 9. pp. 1970–1978. With 1 map. Renseignements relatifs aux index *Aedes aegypti* dans les divers pays d'Afrique pour 1937. I. A. Relevé des index larvaires dans les centres de la Côte de l'Or en 1937. B. Relevé des index larvaires dans les centres de la Nigéria en 1937. C. Index *Aedes aegypti* au Kénya [O'Brien (A. J. R.)]. II. Distribution et incidence d'*Aedes aegypti* au Soudan Anglo-Egyptien en 1937 [Pridie (E. D.)]. [**Data on the Larval Index of *Aëdes aegypti* in the Gold Coast, Nigeria and Kenya in 1937. Distribution and Abundance of *Aëdes aegypti* in the A.-E. Sudan in 1937.**]

The papers give information on numbers of *Aëdes aegypti* found in human habitations in the Gold Coast, Nigeria, Kenya and the Anglo-Egyptian Sudan. The " larval index," *i.e.* the percentage of buildings and compounds in which larvae of this species were found, is used as an expression of the insect's commonness.

There appears to be a healthy rivalry between these territories, and even those in West Africa feel able to report indices much below 1 per cent. As to who collected the figures, or how thoroughly, the reader must judge, for the authors do not help him. *P. A. Buxton.*

Lins (Sinval A.). Caso classico de febre amarella de origem sylvestre. [**A Typical Case of Jungle Yellow Fever.**]—*Folha Med.* 1938. May 5. Vol. 19. No. 13. pp. 149–153. With 1 chart & 2 figs.

A Brazilian of 29 years of age, robust and of good physique, an engineer by profession, was working for the telephone company in Barra Mansa, Rio State, and Bananal in São Paulo where no *Aëdes* is to be found. He was seized with shivering, headache and marked prostration, with early vomiting. The next day the urine diminished owing, it was thought, to the vomiting. The last developed to black vomit and there was almost total suppression of urine. He was

brought to Rio on the fourth day of illness and died on the sixth day. An autopsy was performed and the findings are described. These need not be detailed here; they were those characteristic of yellow fever. Photomicrographs show well the destruction of the liver cells and the condition of the kidney tissue. *H. H. S.*

Tibiriçá (Paulo Q. T.). Pathologia microscopica do figado na febre amarella. [**Histology of the Liver in Yellow Fever.**]—*Ann. Paulist. Med. e Cirurg.* 1938. May. Vol. 35. No. 5. pp. 429–452. With 6 figs. [40 refs.] English summary.

This is an account of a careful, painstaking study of the microscopical anatomy of the liver in yellow fever, and also of the chemistry of the changes observed. Bile pigment was seen to be retained in the hepatic cells proper and in the Kupffer cells; many of these cells were necrosed; the nuclei appeared oedematous with a reticulum at first unchanged. The author discusses, with a good deal of supposition, the chemical changes brought about and the method of their production. The jaundice he regards as haematogenous at first; later, when damage to the liver cells interferes with their function, it is hepatogenous or a mingling of the two. The photomicrographs reproduced in the article are not very convincing; probably colouring is needed to demonstrate the points stressed. *H. H. S.*

da Rocha Lima (H.). Rückblickende Betrachtungen ueber die Entwicklung der Histodiagnose des Gelbfiebers. [**A Retrospective View of the Development of the Histo-Diagnosis of Yellow Fever.**]—Reprinted from *Festschrift Bernhard Nocht z. 80. Geburtstag von seinen Freunden u. Schülern. Hamburg.* 1937. pp. 497–512. [33 refs.]

The author gives an interesting historical review of the subject including extracts from the publications of various pathologists showing the manner in which his early work of 1912 had been overlooked possibly owing to the fact that at the time his views were not generally accepted. Attention is called to the fact that it is impossible to base the histological diagnosis of yellow fever on any single character such as hyaline necrosis, etc., but only by a careful consideration of the evidence provided by a number of changes in the cells. The author stresses the importance of correct diagnosis, and calls attention to some of the difficulties encountered by inexperienced observers.

E. H.

Bablet (J.). Sur le diagnostic différentiel de la fièvre jaune (examen histologique du foie). [**The Differential Diagnosis of Yellow Fever. Histological Examination of the Liver.**]—*Arch. Insts. Pasteur d'Indochine.* 1937. Oct. Vol. 7. No. 26. pp. 177–185. With 5 figs. on 5 plates.

A summary of the methods employed by the author, together with brief account of some previous work on the subject [see this *Bulletin*, 1936, Vol. 33, p. 334]. *E. H.*

FINDLAY (G. M.) & MACCALLUM (F. O.). **Hepatitis and Jaundice associated with Immunization against Certain Virus Diseases.**—*Proc. Roy. Soc. Med.* 1938. May. Vol. 31. No. 7. pp. 799–805 (Sect. of Comp. Med. pp. 35–41). [12 refs.]

Among 3,100 persons immunized against yellow fever by the use of virus and immune serum over a period of five years, 89 cases of jaundice have been traced.

The symptoms closely resemble those produced by common infective hepatic jaundice, cases of which have often been noted as occurring in the same areas. Cases almost always tend to occur in groups in regional areas and have been observed in England, Egypt, Anglo-Egyptian Sudan, South Africa and the West African Colonies, while apart from this series, jaundice has followed yellow fever immunization in South America and in French Gabon. The average period between the time of inoculation and the development of hepatitis has been two to three months. It is of interest that hepatitis in horses has also been noted to occur two to three months after immunization against the virus of horse sickness and equine encephalo-myelitis, and also after the injection of horse serum containing anti-toxins against *Cl. welchii* toxins.

The only common factor between the two was the injection of homologous proteins, either in sera or tissue extracts. The only theories which at present explain the observed facts are that either (1) a hepatotoxic virus is introduced with the virus inoculum or that (2) two factors combine to induce the hepatitis—(*a*) a hepatotoxic substance present in the homologous sera or tissue extract inoculated, and (*b*) an infective agent which, at least in the case of human beings, is probably the causal agent of common infective hepatic jaundice.

E. H.

LEFÈVRE. Note sur l'utilisation du vaccin antiamaril de l'Institut Pasteur de Tunis dans la région nord du Cameroun. [**A Note on the Use of Anti-Yellow Fever Vaccine from the Pasteur Institute, Tunis, in the Region North of the Cameroons.**]—*Arch. Inst. Pasteur de Tunis.* 1938. Mar. Vol. 27. No. 1. pp. 108–110. With 1 fig.

A note on the results of vaccinating 35 Europeans and 29 natives with single injections of neurotropic mouse yellow fever virus coated with egg-yolk. Only mild reactions were observed, except in two cases, both Europeans, one of whom showed an attack of fever on the 14th day rising to 40°C. and lasting for about five days. *E. H.*

CAMBESSÉDÈS (H.). A propos de l'état actuel des vaccinations contre la fièvre jaune. [**The Present Position of Vaccination against Yellow Fever.**]—*Rev. Méd. et Hyg. Trop.* 1937. Nov.–Dec. Vol. 29. No. 6. pp. 273–279.

A general review of the development of methods of vaccination against yellow fever up to the use of attenuated culture virus. In the discussion, Dr. STEFANOPOULO mentioned that the number of subjects in Brazil, vaccinated by this latter method, then reached more than 32,000 without any serious ill-effects having been observed. *E. H.*

Lloyd (Bolivar J.). **The Rôle of Viscerotomy in the Diagnosis and Control of Yellow Fever.**—*Jl. Trop. Med. & Hyg.* 1938. June 15. Vol. 41. No. 12. pp. 197–200.

A general account, including interesting personal reminiscences, in which the author emphasizes the importance of accurate diagnosis in order to avoid unreasonable quarantine measures. Viscerotomy is admitted as a simple and convenient method of obtaining specimens from the deep viscera, but the diagnosis of yellow fever from pathological conditions found in the liver requires a very skilled observer. Cases are mentioned of the erroneous diagnosis of yellow fever from examination of liver tissue by admitted authorities, and the author is of the opinion that one should not accept as final a diagnosis of yellow fever based entirely on the microscopic appearance of the liver. All outbreaks classed as yellow fever should be checked by blood surveys, and it is considered that " seasoned " men of known administrative ability should take the responsibility of evaluating all evidence before the opinions of the " pure scientist " are made a basis for administrative action. *E. H.*

Barthas (E.). Possibilités d'expansion et prophylaxie de la fièvre jaune. [**Possibilities of the Expansion and Prophylaxis of Yellow Fever.**]—*C. R. Soc. Méd. et Hyg. Trop. d'Egypte.* Alexandria. 1936–1937. 8th Year. pp. 56–70.

A general discussion with special reference to the possibility of the spread of yellow fever into Egypt and the Indies. Attention is called to the necessity of maintaining anti-mosquito campaigns in all infected or menaced regions, combined with anti-yellow fever vaccination in endemic areas. *E. H.*

Lancet. 1938. June 18. p. 1414.—**Destruction of Mosquitoes in Aeroplanes. A Test Flight.**

The risk of conveyance of infection by mosquitoes in aeroplanes is well recognized, but to deal satisfactorily with that risk has been no easy matter. It is difficult to ensure that every aeroplane at a port of disembarkation is free from living mosquitoes. The International Convention for Aerial Navigation has laid down certain regulations regarding disinsectization and for their being carried out the sanitary authorities of the countries traversed are responsible, and their ideas as to the performance may, and probably will, vary ; further, forced landings may occur at places where there is no sanitary organization and infected mosquitoes could enter there.

A method of disinfection in flight offers the solution of the difficulty, and a test was made in the presence of experts from the London School of Hygiene and Tropical Medicine, the Air Ministry, the Colonial Office, the Ross Institute and others, with officials of the Imperial Airways. The apparatus is devised by Dr. Park Ross, deputy chief health officer for the Union of South Africa, and Mr. Larmuth, of the South African Fumigation Company. Jets of insecticide spray are propelled by the pressure of an ordinary CO_2 sparklet bulb, or by a " Phantomyst " nebulizer, using Deskito—an aqueous base extract of pyrethrum—which is non-inflammable, non-staining, non-corrosive and not objectionable to passengers.

In the actual test in an aeroplane over the Solent, twelve boxes of mosquitoes were distributed in various parts of the craft. The phantomyst apparatus was started in the rear cabin and after 10 minutes was moved forward to the next and so in succession. Of six hundred mosquitoes liberated all but " one or two " were killed by 15 minutes' exposure or even less. *H. H. S.*

MACKIE (F. P.) & CRABTREE (H. S.). **The Destruction of Mosquitoes in Aircraft.**—*Lancet.* 1938. Aug. 20. pp. 447–450. With 3 figs.

A valuable account of a method of disinfestation of aircraft whilst in flight, a method which would do away with the practical difficulties of providing " sanitary " or insect free aerodromes under different local authorities, apart from the fact that a large number of small refuelling stations are springing up in undeveloped country where there is no ground organization capable of efficient disinfestation.

The choice of an insecticide presented certain difficulties as it was essential that it should have no effect on the passengers or crew, and in view of the risk of fire, any substances with a paraffin-base had to be avoided. The most satisfactory of the samples tested was found to be Messrs. Stafford Allen's " Deskito," a watery base pyrethrum insecticide, which was distributed through the interior of the aircraft by spray apparatus. The latter was of two types, a disseminator specially designed to distribute " dry " insecticide in the passenger cabins, and an " Ejector " suitable for luggage holds, bedding lockers, and all other parts of the aircraft.

The " phantomyst nebuliser " made by Messrs. Andre (Components) Ltd., was used for the passenger cabins, and Larmuth's device, driven by the pressure of CO_2 in a sparklet bulb, for the ejector type.

The results of various experiments carried out for Imperial Airways, Ltd., show the efficiency of this method, and although in some instances the action of the pyrethrum was delayed, all the insects exposed to its action eventually succumbed.

Further experiments are necessary in order to perfect the method, which is doubtless that of the future for cabin type aircraft.

E. H.

SALEUN (G.), CECCALDI (J.) & PALINACCI (A.). Isolement de la première souche de virus amaril au Congo (Afrique Equatoriale Française). [**The Isolation of the First Strain of Yellow Fever in the (French) Congo (French Equatorial Africa).**]—*Bull. Soc. Path. Exot.* 1938. May 11. Vol. 31. No. 5. pp. 418–429.

An isolated case of yellow fever occurred at Brazzaville, and from the blood of this patient, on the fourth day of the disease, the authors infected mice by intracerebral inoculation. The resulting strain of virus, labelled " S.C.", has been passaged for several generations in the brains of mice and by means of cross immunity tests has been shown to be indistinguishable from the Dakar strain of yellow fever. In addition to mice, the authors also succeeded in adapting the virus to guineapigs by intracerebral inoculation of the patient's blood.

The autopsy on the patient also confirmed the diagnosis, since typical pathological changes were observed, and on histological examination of the tissues (by M. BABLET) typical fatty degeneration and intranuclear bodies were found. The sera of seven persons who

had been in direct contact with the patient were examined for yellow fever immune bodies, with negative results.

This is the first strain of yellow fever to be isolated in French Equatorial Africa, and furnishes conclusive evidence of the existence of the disease in that region. *E. H.*

DE ASSUMPÇÃO (Lucas). Prova de proteção intracerebral em camondongo, com o virus isolado em São Paulo de um caso de febre amarela silvestre. [**The Intracerebral Protection Test with Jungle Yellow Fever Virus isolated in São Paulo.**]—*Ann. Paulist. Med. e Cirurg.* 1938. Apr. Vol. 35. No. 4. pp. 351–363. With 14 figs. English summary.

The author carried out protection tests, using the camondongo (Brazilian house rat), and a strain of jungle yellow fever virus isolated in São Paulo in the last outbreak there and compared the results with those of a Dakar neurotropic strain. Serum dilutions ranged from 1 in 100 to 1 in 100,000, and each series of tests was made on seven groups of five animals. All the control animals died with the neurotropic strain and all except one (in the highest dilution of serum) with the São Paulo strain. With the immune serum the results were not quite parallel. The Dakar virus had a shorter incubation, some of the animals began to show symptoms on the third day and were definitely ill by the fourth, with dilution of 1 in 100, longer in higher dilutions, but death occurred after a couple of days' illness. With the São Paulo virus diluted 1 in 100, signs of illness were not observed before the fifth day, and death did not take place till three or four days later. It may be that the differences—the São Paulo virus being apparently somewhat weaker—are ascribable to the fact that the strain had reached its fifteenth transfer. The essential identity, however, is proved by these immunity tests. *H. H. S.*

DE ASSUMPÇÃO (Lucas). Prova de protecção intracerebral em camondongo, com o virus isolado em São Paulo de um caso de febre amarella silvestre. [**Evidence of Intracerebral Protection in the Brazilian House Rat ; Virus isolated from a Case of Jungle Yellow Fever in São Paulo.**]—*Bol. Inst. Hyg. de São Paulo. No. 62.* 22 pp. English summary.

HELMINTHIASIS.

Précis of Abstracts in this Section.

Basnuevo and Anido (p. 35) describe a method of preserving helminth eggs. Hoeppli, Feng and Chu (p. 35) show that adults and larval stages of helminths can be kept alive in various artificial media for considerable periods. No development took place under these experimental conditions.

The prevalence of helminthic infections in Italy and Japan is noted by Giulio (p. 35) and Yumoto and Co (p. 36). The former examined water, soil and house dirt for ova with positive results.

Scott and Barlow (p. 36) found that hookworm, ascaris and schistosome infection in Egyptian peasants, after treatment and in some instances after the construction of bore-hole latrines, was as prevalent within 3 years of that treatment as it had been before, regardless of the presence or absence of the latrines. As these infections, except ascaris, are acquired under field conditions it could hardly be expected that house sanitation could influence them. Sanitation should, however, be extended in the hope that with education the natives can be persuaded to use latrines in the fields. Other methods of control, and medicinal treatment, should be fully used.

Schistosomiasis is reported for the first time in Libya by Cicchitto (p. 37). Tang (p. 37) describes the morphological features of *S. japonicum*. Perdomo Hurtado *et al.* (p. 37) attribute infection with *S. mansoni* to working in river sand. Williams (p. 38) reports a case of schistosomiasis in Szechwan (China). Eggs were found in the appendix but not in the stools. The first case from Kwangei is reported by Yao (p. 38).

Gopsill (p. 38), reports that the level of Lake Nyasa has been rising for some years, and the fertile and thickly populated land of the lake shore is becoming a swamp. *Limnaea laurenti* and *Physopsis africana* are found there and cercariae of *S. mansoni* have been observed penetrating the former and of *S. haematobium* the latter. Ova of both are frequently found in the Natives. Intravenous antimony tartrate is the best treatment. Cawston (p. 38) notes the important mollusc hosts in Mozambique. Klenerman (p. 38) records a family presumed to have been infected with schistosomes after bathing in a river in Natal. Martins and Versiani (p. 39) found an infected *Australorbis glabratus* in a lake in Bello Horizonte (Brazil).

Mainzer (p. 39) shows that in all kinds of infections with *S. haematobium* and *S. mansoni* X-ray examination constantly reveals pulmonary involvement. Asthma may result from infection, but is an allergic phenomenon not related to the pulmonary lesions. It depends upon the constitutional tendency of the patient and his response to the substances liberated by the schistosomes.

Campbell (p. 40) suggests that a large proportion of oriental cases of splenomegaly are due to schistosomiasis. Ova may sometimes be found by duodenal sound though absent in the faeces. If operation for splenectomy is contemplated, the first step should be the excision and examination, by the frozen section method, of a portion of liver tissue. If schistosome ova are found in the liver, splenectomy should not be performed. Buckley (p. 40) describes a swamp itch in Malay due to cercariae of *S. spindale*.

Rodríguez-Molina and Hoffman (p. 40) describe two cases of infection with *Fasciola hepatica*. Emetine treatment was useful. Okabe (p. 40) shows that *Leucogobia gracilis* is an intermediate fish host of *Clonorchis sinensis*. Otto (p. 41) describes the blood changes and serum reactions in infections with *Cl. sinensis*. Vazquez-Colet and Africa (p. 42) detail the fish hosts of two heterophyids found in man. *C. W.*

Basnuevo (José G.) & Anido (Vicente). Manera de conservar huevos de helmintos. [**The Preservation of Helminth Eggs.**]—*Rev. Med. Trop. y Parasit.* Habana. 1938. May–June. Vol. 4. No. 3. pp. 159–160.

If faeces are liquid or mushy, add to 100 grammes 25 cc. of a mixture made up of formol 15, glycerine 20, water 100 ; if they are not, mix them first with 25 cc. of distilled water. If eggs are few, faeces [presumably 100 gm.] are diluted with 100 cc. of water and put through a fine sieve. The filtrate is strongly centrifuged, the supernatant fluid poured off, and to the precipitate is added the fluid noted above. *Clayton Lane.*

Hoeppli (R.), Feng (L. C.) & Chu (H. J.). **Attempts to culture Helminths of Vertebrates in Artificial Media.**—*Chinese Med. Jl.* 1938. Mar. Supp. No. 2. pp. 343–374. [88 refs.]

Adults and larval stages of parasitic helminths were kept alive in artificial media for a considerable period ; no development took place in any case.

Adult *Clonorchis sinensis* did best in " serum " with an equal quantity of Tyrode solution, and also in undiluted heparinized rabbit plasma, surviving at 37°C. as long as five months when there was weekly change of medium ; when there was no such change the maximum was 65 days in a solution of prontosil, 1 in 8,000, in diluted horse serum. Adult *Schistosoma japonicum* at 37°C. lived in horse serum, pure or diluted with an equal amount of Tyrode solution, changed once or twice weekly, for over 5 months, weak prontosil or mercurochrome-220 killing them within a few days. Larvae of *Ascaris suum*, hatched by feeding mature eggs to guineapigs, lived 2 or 3 days in horse or rabbit serum, in normal saline with saline extract of guineapigs' liver, or in living cultures of chicken fibroblasts. *Microfilaria immitis* lived up to 11 days without growth or development and without absorption by white corpuscles. The metacercaria of *Clonorchis sinensis* lived in different media up to 2 weeks, emptying the excretory bladder at various intervals, but undergoing no development. Other animal parasites were also used and the work of other persons is noted. *C. L.*

Giulio (Buonomini). Diffusione dell'elmintiasi in alcuni centri della Campania. [**The Prevalence of Helminthic Infections in Some Centres in the Campagna.**]—Reprinted from *Boll. d. Soc. Ital. di Biol. Sperim.* 1938. Vol. 13. 3 pp.

The results of examination of faecal smears of 430 persons, nearly all under 15, are ascaris 337, trichuris 167, enterobius 7, *Hymenolepis nana* 22. Examination was for 5 to 10 minutes, repeated once or

twice if it was [? completely] negative. Comparison is made with other countries without reference to the technique of examination used in them. Of 4 water receptacles examined there were ascaris eggs in two ; of 4 samples of garden soil all had eggs of ascaris and trichuris, and two those of enterobius ; of six scrapings of dirt from the floors of houses ascaris and trichuris eggs were present in five and enterobius eggs in one. *C. L.*

Yumoto (Yoshika) & Co (Chiden). **The Incidence of Intestinal Parasites in Ishigaki Island, Okinawa Province, Japan.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1938. Aug. Vol. 37. No. 8 (401). [In Japanese pp. 1267–1274. [15 refs.] English summary p. 1274].

The stools examined, each by six smears, numbered 126 ; of the smears five were dilutions in normal saline and one in Donaldson's iodine solution. The percentages reported were : no parasites 19·05, hookworm 34·92, ascaris 8·73, trichuris 2·38, enterobius 3·17, strongyloides 22·22, *H. nana* 3·17, taenia 0·79, *E. histolytica* 7·94, *E. coli* 12·69, *E. nana* 6·35, giardia 14·29. *C. L.*

Young (May R.). **Helminth Parasites of New Zealand. A Bibliography with Alphabetical Lists of Authors, Hosts and Parasites.**—19 pp. 1938. Imperial Bureau of Agricultural Parasitology (Helminthology), Winches Farm, St. Albans. [4*s.*]

Sison (Agerico B. M.) & Tolentino (Delfin G.). **Hypochromic Anemia Secondary to Multiple Parasitism.**—*Jl. Philippine Islands Med. Assoc.* 1938. June. Vol. 18. No. 6. pp. 353–357. With 1 fig.

Scott (J. Allen) & Barlow (Claude H.). **Limitations to the Control of Helminth Parasites in Egypt by Means of Treatment and Sanitation.** —*Amer. Jl. Hyg.* 1938. May. Vol. 27. No. 3. pp. 619–648. With 11 figs. [17 refs.]

" A study has been made of the changes during a period of 6 years in the level of infection with hookworms, ascaris, and the two species of schistosomes in Egyptian peasants living under varying conditions. The prevalence of the parasites and the average intensity of infections as indicated by egg counts have shown sharp fluctuations which cannot be correlated with known causes. Greater changes, always in the direction of reduction, have followed the administration of as much needed treatment as the people could be persuaded to take. Bored-hole latrines were built in all of the houses of some of these villages, but whether or not they were present, the infections had in most cases returned, within 3 years, to their pre-treatment levels. Since these parasites, with the exception of ascaris, are transmitted only under field conditions, it could hardly be expected that house sanitation would affect them significantly. It is to be hoped that, after becoming accustomed to sanitation in their villages, the people can eventually be taught to accept and use latrines in the fields. Education may also be effective in reducing schistosomiasis through teaching the avoidance of pollution of water. At the same time snail control, through canal clearance and modifications in methods of irrigation, gives promise of success. Although sanitation has not been effective as a means of controlling worm parasites under these conditions, its general value should not be underestimated and its further extension to field conditions should be advocated. Furthermore, while the effects

of therapeusis have been shown to be only temporary, treatment to alleviate the condition of the critically ill should not be abandoned."
C. L.

Cicchitto (Elio). I primi casi di schistosomiasi intestinale da "Schistosoma Mansoni" in Libia. [**The First Cases in Libya of Intestinal Infection by** *S. mansoni*.]—*Policlinico.* Sez. Prat. 1938. May 30. Vol. 45. No. 22. pp. 1049–50, 1053–4, 1057. [13 refs.]

Two men are reported upon, who had not been outside Libya. In one, schistosome ova, both lateral spined and terminal spined were found in the faeces after many examinations. In the second repeated examinations disclosed both kinds in the urine. *C. L.*

d'Amico (Mario). Bilarziosi intestinale in due indigeni residenti a Massaua e provenienti da Saganeiti. [**Intestinal Schistosomiasis in Two Natives of Saganeiti in Massawa.**]—*Rass. Sanitaria d. Impero.* Addis Ababa. 1938. Jan.–Feb. Vol. 1. No. 4–5. pp. 57–58.

Bhalerao (G. D.). **Schistosomes and Schistosomiasis in India.**—*Indian Jl. Vet. Sci. & Animal Husbandry.* 1938. June. Vol. 8. Pt. 2. pp. 149–157. [53 refs.]

Tang (C. C.). **Some Remarks on the Morphology of the Miracidium and Cercaria of** *Schistosoma japonicum*.—*Chinese Med. Jl.* 1938. Mar. Supp. No. 2. pp. 423–432. With 12 figs. on 4 plates. [17 refs.]

A confirmation of observations by other workers with some new ones, the investigation being made possible at the Peiping Union Medical College by a Fellowship granted by the Rockefeller Foundation.

It is reported that, caudal to the nerve centre, the body consists of a sac enclosing the germ cells, excretory tubules and the two more caudad flame cells. In all of a large number of eggs observed during hatching, the split in the shell was longitudinal, and if the vitelline membrane does not also split by osmotic pressure the enclosed miracidium dies. As in the case of *S. haematobium* and *S. mansoni* there are in the cercaria five pairs of cephalic glands, the two cephalad pairs oxyphilic and the three caudad pairs basophilic, but in *S. japonicum* the granules in the former are not distinctly coarser than in the latter; otherwise they conform to the characteristics reported for cercariae of the other two schistosomes of man. *C. L.*

Kau (L. S.) & Wu (Kuang). **A Note on the Pathology of Schistosomiasis due to** *S. japonicum* **among Cattle in China.**—*Ann. Trop. Med. & Parasit.* 1938. Aug. 2. Vol. 32. No. 2. pp. 129–132. With 2 figs. on 1 plate.

Perdomo Hurtado (B.), Ruiz Rodríguez (J. M.) & Aníbal Osuna. Un caso de cirrosis hipertrofica de origen bilharziano. [**A Case of Hypertrophic Bilharzial Cirrhosis.**]—*Gac. Med. de Caracas.* 1938. Mar. 15. Vol. 45. No. 5. pp. 67–69.

An intestinal infection by *Schistosoma mansoni* at Caracas, Venezuela, established by faecal examination, was evidently acquired during collection of river sand, for at that time itching appeared over the whole body. *C. L.*

WILLIAMS (T. H.). **Human Schistosoma Infestation in Szechwan. A Case Report.**—*Chinese Med. Jl.* 1938. Aug. Vol. 54. No. 2. pp. 159–161. With 1 fig.

An autochthonous case of schistosome infection is reported from an area of the Szechwan province not hitherto reported as an endemic zone. Eggs were present in an appendix which seems to have been excised for epigastric and general abdominal discomfort " with later symptoms of peptic ulcer." Though the stool was then examined many times and cultured once, no ova or miracidia were seen. Oncomelania snails were found in the area in question. *C. L.*

YAO (Y. T.). **Schistosomiasis in Kwangsi.**—*Chinese Med. Jl.* 1938. Aug. Vol. 54. No. 2. p. 162.

A first record of the infection in the Pin-yang district. *C. L.*

GOPSILL (W. L.). **Some Observations on Schistosomiasis in North Nyasa District.**—*Nyasaland Protectorate Ann. Med. & San. Rep. for Year ending 31st December, 1937.* Appendix III. pp. 95–96.

The most thickly inhabited and most fertile parts of the North Nyasa District are the flat lands on the lake shore. For a number of years the level of the lake has been rising and this land has become a swamp harbouring *Limnaea laurenti* and *Physopsis africana*, but no Planorbis has been found. Cercariae of *S. mansoni* have been watched penetrating the former and those of *S. haematobium* the latter. Ova of *S. mansoni* have been found in 163 of 204 stools and of *S. haematobium* in 79 of 204 urines. Few of those with the latter infection complain of it. Antimony tartrate intravenously has proved more effective than any of the more modern remedies, and in 100 patients after antimony treatment the percentage of haemoglobin rose from 65 to 75, though 83 per cent. of those who had also hookworm infection were still suffering from this. *C. L.*

CAWSTON (F. Gordon). **Molluscs which serve as Hosts for Schistosomes in Mozambique.**—*Jl. Trop. Med. & Hyg.* 1938. June 1. Vol. 41. No. 11. pp. 181–182.

Of the 150 non-marine shells from Portuguese East Africa Major M. CONNOLLY has noted 43 aquatic species and, apart from *Cleopatra* and *Melanoides tuberculatus* which if implicated are rare hosts, the molluscs important for the spread of schistosomiasis are *Physopsis africana, Ph. globosa, Planorbis pfeifferi* and *Bulinus forskali*.

C. L.

i. KLENERMAN (Pauline). **Three Interesting Cases of Bilharzial Infection in a Family.**—*South African Med. Jl.* 1938. May 28. Vol. 12. No. 10. pp. 361–362.

ii. CAWSTON (F. G.). **Undiagnosed Infection in a Family.** [Correspondence.]—*Ibid.* June 11. No. 11. p. 413.

i. After river bathing a father, mother and son had high fever with no malaria parasites or Widal reaction in the blood, no helminthic eggs in urine or faeces at any time, no reaction for *Br. melitensis* or *Br. abortus*. The motions became blood tinged. The child showed

an eosinophilia of 12 per cent., and at one time his penis swelled, apparently simulating giant urticaria. With fouadin, recovery followed in all.

ii. Cawston points out that the diagnosis of schistosomiasis was premature and that there was no warrant for official action warning against river bathing because a family was rumoured to have contracted this infection by so doing. *C. L.*

Cawston (F. Gordon). **Favourite Sites of Schistosomes and a Consideration of their Destruction in Stock.**—*Jl. Trop. Med. & Hyg.* 1938. Sept. 15. Vol. 41. No. 18. pp. 293–294.

Anderson (Ch.). Contribution à l'étude de la bilharziose dans la région des Matmata. (Prospection de l'Oued Djir.) [**On Bilharziasis in Matmata. Inspection of the Wadi Djir.**]—*Bull. Soc. Path. Exot.* 1938. June 8. Vol. 31. No. 6. pp. 498–502.

In Southern Tunisia *Bulinus contortus* has been found in unobvious places such as under culverts. The note is of local importance.

C. L.

Martins (A. Vianna) & Versiani (Waldemar). Schistosomose mansoni em Bello Horizonte. [*S. mansoni* **in Bello Horizonte.**]—*Brasil-Medico.* 1938. May 14. Vol. 52. No. 20. pp. 471–472. English summary (10 lines).

By means of a barrage a lake has been formed in the Prefecture of Bello Horizonte to insure abundant supply of water to the city in future. At its margin were collected 42 examples of *Australorbis glabratus*, of which one emitted cercariae identified as those of *S. mansoni*. Steps have been taken to clean up the lake and bathing in it has been forbidden. *C. L.*

Mainzer (Fritz). **Bilharzial Asthma. Bronchial Asthma in** *Schistosoma* **Infection.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Aug. 25. Vol. 32. No. 2. pp. 253–264. With 3 figs. on 2 plates.

"Three cases of bilharzial asthma are described as a type of allergic reaction dependent on constitutional factors and substances liberated by *Schistosoma* (*haematobium* or *mansoni*).

"One of these cases showed febrile asthma with simultaneous urticarial rashes.

"The two other observations concerned blood relations (uncle and nephew). It was possible to prove that the asthmatic paroxysms had no relation to lesions of the lungs brought about by the parasite, the pulmonary bilharziasis. In all kinds of infections with *S. haematobium* and *mansoni* X-ray examination constantly reveals pulmonary involvement.

"The causal relationship between bilharzia infection and asthma is demonstrated by the complete parallelism in the course of both diseases subsequent to specific therapy.

"The allergic nature of this kind of asthma has been proved by its association with urticaria and the constitutional and hereditary character of this allergy, which is very infrequently encountered, by its occurrence in relatives.

"The resistance of the atypical bilharziasis of the liver and lungs to fuadin treatment is noted." *C. L.*

CAMPBELL (Horace Emerson). **Schistosomiasis and Banti's Disease. An Inquiry into their Possible Relationship.**—*Chinese Med. Jl.* 1938. May. Vol. 53. No. 5. pp. 459–466. [36 refs.]

"As a *working hypothesis*, then, I suggest schistosoma as the etiology in a large proportion of these *Oriental* cases of splenomegaly of unknown origin, variously known as splenic anaemia, Banti's disease, cryptogenetic splenomegaly, etc."

Campbell notes how cases of this kind have been reported from Peiping, Swatow and Formosa, but that no known cases of schistosomiasis have been reported from the first or last of these places. He reviews experience in China, including his own [this *Bulletin*, 1937, Vol. 34, p. 389], in Egypt, and in Italy by GREPPI [this *Bulletin*, 1937, Vol. 34, p. 387], and points out that ova may not be found in stools in schistosome infection and yet may be got by duodenal sound, and that they cannot, of course, be found when infection is by male parasites alone. Repeated intensive study may be needed to disclose ova, liver biopsy with immediate sectioning of frozen tissue being undertaken as a first step in a splenectomy, this last not being proceeded with if eggs are so found. *C. L.*

BUCKLEY (J. J. C.) **On a Dermatitis in Malays caused by the Cercariae of *Schistosoma spindale* Montgomery, 1906.**—*Jl. Helminthology.* 1938. May. Vol. 16. No. 2. pp. 117–120.

A swamp itch has been attributed by Malays to paddy cultivation in waters which contain snails. These snails were identified as *Planorbis exustus* and a *Limnaea* species. From these emerged an echinostome cercaria, one with an oral stylet, and a furcocercous cercaria. The two first produced no itching when put on the forearm ; the last did, and developed in mice into *S. spindale*. Probably the local optimum definitive host is the Indian water buffalo which is used in cultivation. The Malays have found that the wearing of boots and putties may prevent the itch. *C. L.*

RODRÍGUEZ-MOLINA (Rafael) & HOFFMAN (William A.). **The Concomitance of *Schistosoma mansoni* and *Fasciola hepatica*.**—*Rev. Med. Trop. y Parasit.* Habana. 1938. May–June. Vol. 4. No. 3. pp. 133–140.

In these two cases the schistosome infection had apparently been controlled before the fasciola infection was acquired ; the latter seems to have been got by chewing grass in one instance, and eating watercress in the other, picked from the areas polluted by cattle. In one the symptoms were suggestive of gallstones and in the other of duodenal ulcer. After emetine all symptoms disappeared in the first and fasciola eggs could not be found in the faeces, while in the second the symptoms greatly improved but fasciola eggs did not disappear.

C. L.

OKABE (Koyo). **On the Second Intermediate Hosts of *Clonorchis sinensis* (Cobbold) in Hukuoka Prefecture.**—*Fukuoka Acta Med.* (*Fukuoka-Ikwadaigaku-Zasshi*). 1938. July. Vol. 31. No. 7. [In Japanese pp. 1217–1229. [29 refs.] English summary pp. 140–144.]

The paper contains the names of 43 fish which have been reported as second intermediate hosts of *Clonorchis sinensis*, together with those

of the authors responsible for placing them on the list and the countries in which the observations were made. Okabe's present addition is *Leucogobia gracilis.* *C. L.*

Otto (J. H. F.), Tschan (Tsching Ji) & Au (Lifu). Weitere Beobachtungen und Erfahrungen in Canton tierische Schmarotzer der menschlichen Verdauungsorgane betreffend. [**Further Observations on Parasites of the Digestive Organs of Man in Canton.**]—Reprinted from *Tung-Chi Med. Monatsschrift.* 1938. No. 6. 17 pp. [25 refs.]

The report is on 978 patients whose stools were examined by the Telemann technique.

Of them the percentages shown to be infected were: in all 48·6 (over 100 patients with more than one kind of parasite); with *Opisthorchis* [? *Clonorchis*] *sinensis* 40·5 in men and 34·5 in women after one examination. Urobilinogen was present in 17·1 of opisthorchis cases, fasting blood sugar was not affected by any parasite. In fasting blood, eosinophilia was higher by 5 per cent. in those with clonorchis than in those with any other infection or with no infection. Clonorchis infection seems to increase reflex irritability, and in the graduated Takata reaction mentioned by Mancke gave more precipitate in the sera, and increased when there was a diagnosis of gastric and duodenal ulcer. *C. L.*

Hsü (H. F.) & Khaw (O. K.). **Studies on Certain Problems of *Clonorchis sinensis*. III. On the Morphology of the Metacercaria.**—Reprinted from *Festschrift Bernhard Nocht z. 80. Geburtstag von seinen Freunden u. Schülern. Hamburg.* 1937. pp. 216–220. With 1 fig.

The metacercaria of *Clonorchis sinensis* is clearly pictured and a table shows the differences between it and the metacercaria of *Opisthorchis felineus.* *C. L.*

Chu (H. J.). **Certain Behavior Reactions of *Schistosoma japonicum* and *Clonorchis sinensis* in vitro.**—*Chinese Med. Jl.* 1938. Mar. Supp. No. 2. pp. 411–417. With 1 fig.

Freund (Ludwig). Die Einschleppungsmöglichkeit der Haemoptoe parasitaria nach Mitteleuropa. [**The Possibility of the Importation of Parasitic Haemoptysis into Mid-Europe.**]—*Med. Klin.* 1938. June 24. Vol. 34. No. 25 (1748). pp. 831–832.

The possibility that the parasite of haemoptysis may gain a footing in middle Europe is considered.

The likelihood that *Paragonimus westermanii* may gain this footing remains an interesting theoretical problem which one may hope will never have a practical significance, but it gives to European medical men an insight into the pathology of man's parasites. [Readers should not accept either generic or specific names as correct in the varying forms in which they appear.] *C. L.*

VAZQUEZ-COLET (Ana) & AFRICA (Candido M.). **Determination of the Piscine Intermediate Hosts of Philippine Heterophyid Trematodes by Feeding Experiments.**—*Philippine Jl. Sci.* 1938. Apr. Vol. 65. No. 4. pp. 293–302. [15 refs.]

Of heterophyids which have been found in man, *Monorchotrema yokogawai* has as piscine intermediary *Hemiramphus georgi*, *Ambassis buruensis*, *Mugil* sp., *Clarias batrachus* and *Arius manillensis*. *Diorchitrema pseudocirrata* occurs in *Mugil* sp. *C. L.*

KAU (L. S.) & WU (Kuang). **Pathological Findings among Pigs experimentally infected with** *Fasciolopsis buskii*.—*Ann. Trop. Med. & Parasit.* 1938. Aug. 2. Vol. 32. No. 2. pp. 133–136. With 2 figs. on 1 plate.

YAWS AND SYPHILIS.

Précis of Abstracts in this Section.

Bottema (p. 44) studied the syphilis observed in comparable groups of Asiatic and European men in the Dutch Royal Navy. No difference was to be found and racial factors showed no influence on any form of the disease. The so-called "Tropical syphilis" has been described as a result of confusion between yaws and syphilis, the observation of natives who do not correctly represent the whole population, and of patients poorly treated and in bad general condition.

Saunders and Muench (p. 44) found that 70 to 80 per cent. of persons aged 15 to 20 in Jamaica have been infected with yaws. The peak of the infection rate occurs at about 8 years of age, and there are few new infections after 30. There is probably a higher mortality in yaws-infected children than in others. Males show higher rates than females.

Pardo-Castelló (p. 45) in Cuba reports that a commission working in 1937 found yaws to be limited to the Province of Oriente. Yaws was imported less than 50 years ago and the majority of those infected were born in Cuba. Only 2·7 per 1,000 of the inhabitants of Baracoa are infected. *Hippelates pallipes*, a capable transmitter in Jamaica, abounds in parts of Cuba.

Chambers (p. 45) emphasizes the importance of a warm and humid climate in the distribution of yaws.

Ferris and Turner (p. 45) give descriptions, which cannot be abstracted, of the histopathology of the cutaneous and subcutaneous lesions of yaws. Histological criteria for the differentiation of the cutaneous and subcutaneous lesions of yaws and syphilis are in general unreliable. Ferris and Turner (p. 47) found pronounced and constant differences in the evolution of the lesions caused by *S. pertenuis* and *S. pallida* when inoculated into the skin of rabbits. *S. pallida* produced more well developed lesions, which did not subside as did those produced by *S. pertenuis*. There was no evidence of phagocytosis in either. Takahasi (p. 48) found changes in the aorta in 168 rabbits infected with syphilis, but none in 13 infected with yaws or in 3 with rat-bite fever. Necrosis of the media and inflammation of the media and adventitia were observed. Aneurysm was frequent. On p. 49 this author describes his experiments in injecting *S. pallida* and *S. pertenuis* into the testes and skin of rabbits. The essential point of difference was the distribution of the organisms, widely into the tissues (with mucoid degeneration) and vessel walls in the case of *S. pallida*, congregated in heaps (without mucoid degeneration) in the case of *S. pertenuis*. The syphilitic animals showed spirochaetes and necrosis in the epithelium and corium of the skin, but the yaws lesions were usually confined to the epidermis.

Jolly and Di Ruggiero (p. 50) describe a case of gangosa in Guadeloupe. They discuss the aetiology. Ihlenfeldt (p. 50) describes a patient with paranasal swellings which appeared to resemble goundou. Salah (p. 51) attributes a case of juxta-articular nodules to a syphilitic infection.

Fernando and de Ogampo (p. 51) found that the cerebrospinal fluids of 26 cases of tertiary yaws were all negative to the Wassermann reaction. de Haas (p. 51) diagnosed periostitis of the radius, ulna,

tibia and fibula in a child aged 18 months with a framboesial rash, as due to yaws and not to syphilis, because the Wassermann reaction of the mother's serum was negative, though that of the child was positive.

Heckenroth (p. 51) discusses arsenic resistance in yaws, and believes that it may be broken by resort to bismuth or other drugs. Gminder (p. 52) reports favourably on Pyoktanin coeruleum Merck, 1 per cent. solution, in the treatment of tertiary yaws. *C. W.*

Bottema (C. W.). Bestaat er tropische syphilis? [**Is there a Tropical Syphilis?**]—*Nederl. Tijdschr. v. Geneesk.* 1937. Nov. 20. Vol. 81. No. 47. pp. 5593–5600. [17 refs.] English summary. [Summary appears also in *Bulletin of Hygiene.*]

"A comparison was made between 321 cases of recent syphilis in Asiatic and 770 cases in European subjects, all military men of the Dutch Royal Navy, all well cared for and well-nourished, and not in a position to conceal their disease to any appreciable extent. This investigation and a study of the literature of the last 5 years led to the following conclusions:—

"1. Primary and secondary syphilis in Europeans and Asiatics run a quite analogous course.

"2. Paraluetic, congenital and the other forms of syphilis occur in Asiatics as well as in Europeans.

"3. As concerns the ethnological groups of the East Indian Archipelago, no influence worth mentioning on the course of syphilis results from racial factors.

"4. The picture till the present designed as 'tropical syphilis' has mainly found its origin in one or more of the following factors which have nothing to do directly with syphilis nor with race:

"i. Confusion between yaws and syphilis.

"ii. Conclusions taken from observating on a one-sided supply of native patients attending the dispensaries of the Western pattern, which conclusions do not hold for the total population.

"iii. The result of neglect, lack of care and of efficient treatment.

"iv. The influence of a poor general physical condition, however caused."

Saunders (G. M.) & Muench (H.). **The Age Distribution and the Infection Rate of Yaws in Jamaica.**—*Amer. Jl. Hyg.* 1937. Nov. Vol. 26. No. 3. pp. 423–436. With 3 charts.

"1. This report is based upon a study of 23,000 persons living in a yaws-infested, rural area in Jamaica, B.W.I.

"2. The proportion of the population with yaws increases rapidly to a level of 70 to 80 per cent. at 15 to 20 years of age, after which there is a gradual decrease.

"3. Annual infection rates among previously uninfected persons rise sharply to a peak of 20 to 30 per cent. at about 8 years of age, followed by a more gradual fall. There are few new infections occurring after 30 years of age.

"4. The proportion of the population with yaws falls short of the level expected on the basis of the annual attack rates. This discrepancy increases most rapidly during the first decade, which is hard to explain on any basis other than that of a higher mortality in childhood among yaws sufferers than among those uninfected.

" 5. A comparison of the sexes shows certain differences. (*a*) The level of infection is higher among males and its peak is reached earlier. (*b*) The annual infection rates for males are consistently higher and reach their peaks about a year later than the rates for females."

H. S. Stannus.

PARDO-CASTELLÓ (V.). Frambesia en Cuba. [**Yaws in Cuba.**]—*Vida Nueva.* 1938. June 15. Vol. 41. No. 6. pp. 335–345. With 8 figs. English summary.

A Commission to study the prevalence of yaws in Cuba was constituted in 1936 and began its work in February 1937. So far the Commission has succeeded in showing that the disease is limited to a single Province, Oriente, and it is hoped that the investigation will be completed during the present year. It appears that yaws was imported into the island less than half a century ago, and probably during the war of 1895, into Baracoa and Sagua de Tánamo. Nearly all those found infected (97 per cent.) were Cuban-born, and 59 per cent. were negroes ; males affected were about half as many again as females. Only 274 cases have been found altogether, or 2·7 per thousand inhabitants in Baracoa. Of the total nearly half (133) were seen in Baracoa, and 103 in Sagua de Tánamo ; all of the last and all but two of the former were Cubans. The ages of 237 of the patients are given ; of these 76 (32·1 per cent.) were under 10 years, 70 (29·5) between 10 and 20 years, 57 (24·1) between 20 and 40 years, and 34 (14·3) over 40 years. For treatment arsphenamine and bismuth have given the best results, but if there was difficulty in obtaining these stovarsol and spirocid brought about healing of lesions and so reduced the sources of infection. *Hippelates pallipes*, found to be a capable transmitter in Jamaica, abounds in parts of Cuba ; it goes locally by the name of *guasasa.* *H. H. S.*

CHAMBERS (H. D.). **Warmth and Humidity as Predisposing Factors in the Incidence of Yaws.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Jan. 25. Vol. 31. No. 4. pp. 451–456.

A short article to emphasize the importance of warm climate and humidity in the distribution of yaws, humidity in turn depending in great part upon geological formation. [These questions were dealt with at considerable length by the Jamaica Yaws Commission yet there is not any reference to the Commission's Reports.]

H. S. S.

FERRIS (Henry W.) & TURNER (Thomas B.). **Comparative Histology of Yaws and Syphilis in Jamaica.**—*Arch. Pathology.* 1937. Dec. Vol. 24. No. 6. pp. 703–737. With 7 figs. [31 refs.]

As has been pointed out before by the reviewer there are but few descriptions of the histopathology of yaws and very few that do not date back ten, twenty and thirty years ago. The present authoritative contribution to the subject is therefore the more welcome. The full descriptions of the lesions investigated it is impossible to epitomize ; they should be read in detail by all interested in the subject. The authors' own summary and conclusions are therefore given :—

" It is obvious from the preceding descriptions of cutaneous and subcutaneous lesions of yaws that they may be conveniently divided into

several distinct morphologic groups. The first group is that in which an overgrowth of the epidermis is the conspicuous feature. Two types of lesions may be included: the primary ("initial" or "mother") yaw and the frambesiform lesion. The initial lesion and the frambesiform yaw may be indistinguishable except that fibrous tissue tends to be more abundant with increased age of the mother yaw. Spirochaetes are uniformly present in the frambesiform papules. In the initial lesion, which was apparently of the greater age, none was seen in sections, though they were seen in dark field preparations. Organisms were abundant in the other specimen. Williams noted the great similarity between the primary lesion of yaws and the frambesioma. Spirochaetes were not numerous in the initial lesion which he studied.

"The second main group of lesions from an anatomic standpoint is that which is characterized by only slight if any evidence of epithelial hyperplasia. These lesions are the scaly or squamous lesions, some of which are described as annular or ringworm in type, and the folliculopapules. In the folliculopapules there is practically no evidence of hyperplasia of the epithelium and little or no keratinization. The scaly macules present thickening of the epidermis, with some increase of keratinization, and a slight tendency toward hypertrophy of the rete pegs, in which melanin may be somewhat decreased. The changes in the dermis are essentially similar to those in the folliculopapules except that histiocytes (epithelioid cells) may be present in small groups. In both the folliculopapules and the scaly macules, spirochetes are demonstrable in about 50 per cent. of the cases. They are more abundant in the dermis, though nowhere in as large numbers as in the frambesiform lesions. There is but scant literature on the histology of these lesions. MacLeod described and illustrated them. His observations are in close accord with ours.

"A third type of lesion is seen late in the disease. It is characterized by necrosis and ulceration with granulation tissue and dense fibrous tissue. There are frequently epithelioid cells or giant cells. In some instances the late lesions may be hypertrophic with little or no ulceration. In these the proliferating epithelial pegs do not, as a rule, extend as deep into the underlying dermis as in the frambesioma and tend to be more irregular in size and shape. Epithelial hyperplasia at the margins of ulcers may be secondary regeneration associated with the chronic inflammation rather than primary hyperplasia. Hallenberger also noted this epithelial proliferation at the edges of the "gummatous" ulcers of yaws. There is in general the same type of exudate in the epidermis and dermis as is seen in the early proliferative lesions, and indeed some of the late hypertrophic lesions may closely simulate the frambesiomas except for the absence of spirochaetes.

"The fourth type of lesion is the indurated nodule which is found in the subcutaneous tissue. In one instance it consists of dense hyalinized connective tissue, which may represent a healed gumma. It is noteworthy that a late destructive lesion is also present in this case. It is possible that a necrotic nodule may ulcerate through the skin, producing there a destructive lesion."

"The initial lesion and the frambesiomas of yaws are characterized by epithelial hyperplasia with exudation of polymorphonuclear leukocytes. There are many lymphocytes and plasma cells in the dermis. The scaly macules and folliculopapules have little proliferation of epithelium and only scant infiltrations of lymphocytes and plasma cells in the dermis. In the late lesions of yaws there is usually ulceration with varying degrees of epithelial hyperplasia.

"With silver preparation, the treponemes of yaws (*T. pertenue*) are constantly found in large numbers in the epidermis and more superficial dermis of the frambesiform lesions and may be numerous in the initial lesion. They are demonstrated in small numbers in the hair follicles and dermis of about 50 per cent. of the folliculopapules and scaly macules of yaws. They are occasionally recognized in small numbers in late lesions.

" Spirochetes are demonstrable in about 70 per cent. of the papules and maculopapules of syphilis.

" There is no evidence that in either yaws or syphilis the spirochetes are phagocytosed by polymorphonuclear leukocytes or histiocytes.

" There is no correlation between the titer of the Wassermann reaction of the blood and the presence or number of spirochetes in the cutaneous lesions of yaws.

" Histologic criteria for the differentiation of the cutaneous and subcutaneous lesions of yaws and syphilis are in general unreliable."

H. S. S.

FERRIS (Henry W.) & TURNER (Thomas B.). **Comparison of Cutaneous Lesions produced in Rabbits by Intracutaneous Inoculation of Spirochetes from Yaws and Syphilis.**—*Arch. Pathology.* 1938. Aug. Vol. 26. No. 2. pp. 491–500. With 4 figs.

In a previous paper the authors dealt with the comparative histological changes in cutaneous lesions of yaws and syphilis in man [see above]. In the present article the comparative histological changes produced in the skin of rabbits by the inoculation of yaws and syphilis spirochaetes are set forth, care being taken to ensure that the infectious agent was the only major variable factor, and that the method of experiment was strictly comparable in all cases. Though " the inoculums for all the strains of *T. pertenue* and *S. pallida* seemed to contain approximately the same number of organisms, there was a pronounced difference in the evolution of the lesions of yaws as compared with those of syphilis. This difference was uniform for each of the three strains of *T. pertenue* and *S. pallida*."

Number of Areas Inoculated with T. pertenue or S. pallida showing no Lesions, Slight Lesions or Well Developed Lesions at Various Intervals after Inoculation.

Days after Inoculation	Number of Areas Unexcised	Number of Areas showing		
		No Lesion	Slight Lesion	Well Developed Lesion
Yaws Rabbits.				
7	36	0	36	0
14	28	10	16	2
21	25	7	18	0
28	21	21	0	0
42	13	13	0	0
Syphilis Rabbits.				
7	36	6	30	0
14	33	0	33	0
21	30	1	25	4
28	27	1	7	19
42	20	0	2	18

" In this series of rabbits, the initial lesion produced by *T. pertenue* following intracutaneous inoculation was less rapid in its development and did not attain the size of the lesion produced by *S. pallida*.

" In lesions of comparable size, the histologic changes are qualitatively the same in yaws and syphilis, consisting predominantly in lymphocytic

infiltration about hair follicles and small blood vessels. The lesions of yaws subside rapidly, while those of syphilis become indurated by new formation of fibrous tissue.

" The distribution of the spirochaetes in hair follicles and epidermis is essentially the same in comparable lesions of the two diseases.

" In the larger lesions of syphilis, necrosis and an exudation of polymorphonuclear leukocytes are prominent, and spirochetes are numerous. In the lesions of yaws there are few spirochetes, and they disappear rapidly.

" There is no evidence of phagocytosis of spirochetes by any type of cell in either yaws or syphilis." *H. S. S.*

Takahasi (H.). Beiträge zur histopathologischen Untersuchung der experimentellen Syphilis und Frambösie bei Kaninchen. I. Mitteilung. Pathologische Veränderungen der Aortenwand. [**Contributions to the Histopathological Investigation of Experimental Syphilis and Yaws. 1st Communication : Pathological Changes of the Aorta.**]—*Japanese Jl. Experim. Med.* 1937. Oct. 20. Vol. 15. No. 5. pp. 321–327. [Summary appears also in *Bulletin of Hygiene.*]

For a number of years Takahasi has been examining the aortas of rabbits infected respectively with 8 strains of *Sp. pallida*, with 4 strains of *Sp. pertenuis* and with the spirochaetes of rat-bite fever. The aortas were examined histologically after staining for tissue changes and for bacterial (including spirochaetal) content and were tested culturally as well as by inoculation into the scrotum of other rabbits. Of 168 rabbits infected with syphilis the number with aortic changes was 29, but in 34 normal rabbits, 13 infected with yaws and 3 with rat-bite fever no such changes were found. Of 78 syphilitic rabbits examined less than 100 days after infection, only 5 showed aortic changes, the remaining 24 occurring in 90 rabbits with older infections. No difference between the strains was found in respect of frequency with which they infected the aorta. The changes were in two main forms, sometimes combined in one specimen, namely with necrotic changes in the media and with inflammatory changes of the media and adventitia. The two forms, of which the first was by far the commonest, are described in detail. Aneurysms were found in 12 of the 29 rabbits. They were in all stages, so that the author is able to confirm that the changes in the media play the chief rôle in the development of aneurysm. No spirochaetes or other bacteria were found in the sections but by inoculation experiments *Sp. pallida* was found in two cases of mesaortitis. *L. W. Harrison.*

Takahasi (H.). Beiträge zur histopathologischen Untersuchung der experimentellen Syphilis und Frambösie bei Kaninchen. II. Mitteilung. Orchitis und Initialsklerose der Rückenhaut sowie des Hodensacks. [**Contributions to Histopathological Investigations of Experimental Syphilis and Framboesia in Rabbits. Second Communication. Orchitis and Primary Sclerosis of the Skin of the Back and the Scrotum.**]—*Japanese Jl. Experim. Med.* 1937. Dec. 20. Vol. 15. No. 6. pp. 401–406. With 4 figs. on 2 plates. [13 refs.] [Summary appears also in *Bulletin of Hygiene.*]

Takahasi refers first to the work of numerous authors who have tried to settle the problem of the identity or otherwise of syphilis

and yaws by histological examination and criticizes it on the ground of the authors having concentrated too narrowly on the tissue changes and paid too little attention to the biological peculiarities of the micro-organisms. His researches have aimed to fill this gap, and he claims to demonstrate a strong difference between the two diseases in respect of distribution of spirochaetes in the testes and skin of rabbits after experimental inoculation. The spirochaetes used in the research were three laboratory strains of *Sp. pallida* and four of *Sp. pertenuis*. The rabbits studied in the investigation were inoculated with emulsions obtained from the testes of rabbits which had reached the acme of the syphilitic or framboesial orchitis, according to the case, following inoculation with the respective organisms. The emulsion was of a strength of 3 to 5 organisms per field. The inoculations were into the testes and the skin of the back and the scrotum.

In the tunica albuginea and tunica vasculosa of the testes inoculated with *Sp. pallida* the usual result was a diffuse cellular infiltration and mucoid degeneration which contrasted with the circumscribed infiltration and degeneration found after inoculation with *Sp. pertenuis*, but often in the syphilitic testes the infiltrations were circumscribed, making a differentiation on the score of histological changes in the tissues difficult. The differentiation was, however, quite easy when the distribution of the spirochaetes was considered. In the syphilitic testes *Sp. pallida* was spread widely throughout the cell infiltrates and especially so in the vessel walls and connective tissue fibres of the foci. In the case of the testes infected with *Sp. pertenuis* this organism was congregated in heaps. In the interstitial tissue of the syphilitic testes there was widespread mucoid degeneration or necrotic change often leading to great increase of connective tissue. In the framboesial testes there was no mucoid degeneration, only granular nodules formed of circumscribed infiltrates of round cells, and the connective tissue was only slightly increased. At the same time some syphilitic testes showed changes that were difficult to distinguish from those seen in the framboesial, but again the distribution of the spirochaetes in the same way as in the tunicae made the differentiation easy. The blood vessels, both veins and arteries, of the testes inoculated with *Sp. pallida* showed innumerable spirochaetes in their walls, while in the framboesial testes such appearances were rare and only slight.

In the skin inoculated with *Sp. pallida* the epithelial and immediately adjoining corium were necrosed, and the changes in the vessels of the corium as well as the increase of the reticular tissue was very marked, while in the yaws-infected skins the changes were chiefly in the epidermis, though again the tissue changes in the two diseases were sometimes very similar. Again *Sp. pallida* was distributed widely through the deeper tissues, especially in the corium and connective tissue fibres, vessel walls and nerves of the subcutaneous tissues. *Sp. pertenuis*, on the contrary, was seen only seldom in the corium and not at all in the subcutaneous tissues but abundantly in the epidermis, the prickle cell layer and the outer hair sheaths. This distribution of *Sp. pertenuis* in the rabbit's skin tissues accords with that found by Schüffner, Siebert, Hallenberger and others in the skin of human beings suffering from yaws. The induration of the primary lesion was proportional to the increase of the reticular tissue and the mucoid degeneration of the corium, being therefore much more marked in the syphilitic chancres than in the primary yaws.

The article is illustrated with four photomicrographs, two of the testes in yaws and syphilis respectively and two of the skin in yaws, to demonstrate the differences in the distribution of the two varieties of spirochaetes. *L. W. Harrison.*

JOLLY (A.) & DI RUGGIERO. A propos d'un cas de gangosa observé en Guadeloupe. [**Gangosa seen in Guadeloupe.**]—*Bull. Soc. Path. Exot.* 1937. Oct. 13. Vol. 30. No. 8. pp. 708–712. With 1 fig.

The designation rhinopharyngitis mutilans or gangosa has been used by various authors for a number of conditions of varying aetiology including yaws, syphilis, leishmaniasis, blastomycosis, Tucumaniasis, etc.

The case now described, the first the authors believe to have been observed in the Antilles, occurred in the person of a 39-year-old male native of Guadeloupe, who came from a yaws area but who had no history or sign of infection with yaws. There was ulceration of both nostrils with destruction of the columna and septum but no perforation of the palate. There was also noted a number of nodules the size of a pea in the skin of the lobules of the nose which on pressure yielded a drop of pus. Smears made from the several lesions revealed yeast-like elements, resembling Breinl's *Cryptococcus mutilans* but no spirochaete, leishmania nor acid-fast bacilli. Culture and animal inoculation were negative. Pathological examination of a biopsy specimen showed a granulomatous change of doubtful syphilitic origin. The Meinicke reaction of blood serum was strongly positive and the ulceration healed completely in three weeks with treatment by acetylarsan.

The authors believe the disease in this case to have been due to the cryptococcus and not to have been a manifestation of yaws or syphilis, with a secondary infection. [This opinion will probably not be shared by many of those who read the article. It should be noted also that this is by no means the first case of gangosa to be reported from the West Indies.] *H. S. S.*

IHLENFELDT (G.). Ueber einen Fall von Gundu. [**A Case of Goundou.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Feb. Vol. 42. No. 2. pp. 74–75.

The case record of a 54-year-old man who exhibited small symmetrical paranasal swellings. These were oval in shape, the one 2·3×5 cm., the other 2·0×1·4 cm., and due, as radiological examination showed, to hyperostosis of the nasal processes of the maxillae. They had not been noticed by the patient or his relations and were so small that they could not be demonstrated by photograph. The nasal mucous membrane was normal; the skin moved freely over the swellings; there was no pain. Though the man had been in German S.W. Africa in 1904 for eight months there was no history of yaws or syphilis or indeed of any tropical infection. He had had in 1911 a resection of nasal septum done for some condition which had been called asthma.

[It seems a pity to label this a case of goundou, since that term has been used to denote some more specific lesion. Goundou-like swellings may occur in a number of osseous affections as in Paget's disease, osteitis fibrosa and leontiasis ossea.] *H. S. S.*

Salah (M.). **Juxta-Articular Nodes. Report of the First Case in Egypt.** —*Jl. Egyptian Med. Assoc.* 1938. May. Vol. 21. No. 5. pp. 288–301. With 7 figs. [40 refs.]

A case of J.A.N. in a native of Egypt, considered to be the first recorded from that country. Syphilis in the absence of yaws believed to be the cause: W.R. and Kahn test positive. *H. S. S.*

Carol (W. L. L.) & Prakken (J. R.). Eenige gevallen van nodositas juxta-articularis. [**Cases of Juxta-articular Nodules.**]—*Nederl. Tijdschr. v. Geneesk.* 1938. July 2. Vol. 82. No. 27. pp. 3315–3322. With 5 figs. on 2 plates. [44 refs.] English summary.

Fernando (Antonio S.) & de Ogampo (Geminiano). **Wassermann Reaction of the Cerebrospinal Fluid in the Diagnosis of Yaws of the Nose and Throat.**—*Jl. Philippine Islands Med. Assoc.* 1938. June. Vol. 18. No. 6. pp. 347–352.

The cerebrospinal fluids from 26 cases of tertiary yaws exhibiting lesions of throat and nose were examined. All showed a negative W.R. and normal cellular and biochemical contents. The cases were chosen carefully to exclude syphilis and tuberculosis. *H. S. S.*

de Haas. Periostitis framboetica infantilis. [**Periostitis in an Infant with Yaws.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. Sept. 13. Vol. 78. No. 37. pp. 2281–2282. With 2 figs. on 1 plate.

The subject was a child of 18 months who had been ailing for a month, during the first ten days of which there had been fever. A framboesial rash was present which yielded to sulpharsenol and bismuth in 2½ weeks.

X-rays showed a periostitis along the radius and ulna and the tibia and fibula and some callus at the lower end of the right fibula. Though the difficulty of differentiating yaws from congenital syphilis is well known, the author regards the basic condition in the present case as yaws because the W.R. was positive in the child but negative in the mother. *H. H. S.*

Heckenroth (Marcel) [Médecin des Troupes coloniales, Ancien Préparateur de Médecine exotique, Diplômé de Médecine coloniale]. Les arséno-résistances et les arséno-récidives au cours du traitement du pian. [**The Treatment of Yaws with Arsenicals; Resistance and Relapse.**] [Thesis.]—132 pp. [Bibliography.] 1937. Bordeaux: Imprimerie-Librairie Delmas, 6 Place Saint-Christoly.

Like many theses presented for the M.D. of French Universities, this Bordeaux thesis by Dr. Marcel Heckenroth is merely a discussion upon the subject on the title page without any new facts being presented.

Another common failing, and one noticeable in this paper, is an attempt at over-elaboration and lack of precision in conclusions. The first part of the book is devoted to a discussion of so-called "arsenic-resistance" in syphilis and trypanosomiasis. The work of

Warrington YORKE and his colleagues really forms the basis of our knowledge on this subject and nothing of value is added. In the second chapter the well-known fact that quite a fair proportion of cases of yaws relapse after short courses of treatment is dealt with and referred to as arsenical-relapse (arséno-récidives), followed by the citation of some few cases from other observers in which it is argued arsenic-resistance was exhibited. It is further suggested on clinical grounds that arsenic-resistance may be " broken " by resort to bismuth or some other drug. It is further believed on clinical reports of two native cases that arsenic-resistance is transmitted by the parasite of yaws [but nothing is proved]. *H. S. S.*

GMINDER (Ernst J.). Pyoktanin in der Behandlung der tertiären Frambösiegeschwüre. [**Pyoktanin in the Treatment of Tertiary Lesions of Yaws.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Jan. Vol. 42. No. 1. pp. 23–25.

Writing from the Mission Hospital, Agogo, Gold Coast, the author finds Pyoktanin coeruleum Merck in 1 per cent. solution a very useful remedy in treating the tertiary lesions of yaws. *H. S. S.*

SPRUE.

Précis of Abstracts in this Section.

Salah (p. 54) records a patient (believed to be the first case of sprue in an Egyptian) successfully treated, on the lines laid down by Fairley, by dieting and the administration of liver and HCl. Stalder (p. 54) describes two patients suffering from non-tropical sprue, the first treated successfully with Campolon, the second failing to respond either to Campolon or Cortin. He considers that a secondary B_2 avitaminosis is concerned in this condition. Rohr (p. 55) finds that in non-tropical sprue the calcium content of the stool is high, not because absorption powers are deficient but because calcium combines with the unabsorbed fatty acids to form relatively insoluble soaps. The three co-acting factors in non-tropical sprue are gastro-intestinal disorder, deficiency of vitamin, or iron, calcium and Castle's factor, and endocrine disturbance, of which the first is the most important. van Leeuwen (p. 56), also stresses the importance of gastro-intestinal disorders and endocrine disturbance. Barker and Rhoads (p. 57) as a result of investigations on cases of sprue conclude that malabsorption of fat is the cause of the diarrhoea rather than *vice versa*. Hopman (p. 58) explains tropical sprue as one of a series of results which follow defective adjustment to the metabolic requirements of hot climates. This series includes obesity and diabetes, which, like sprue, are safety valves against overheating. He has treated patients successfully with intravenous calcium. Jelke (p. 59) reports a patient with non-tropical sprue who improved on a fatless diet, liver and "calcinat." Pesce (p. 59) treated a case of sprue successfully with milk, and describes a condition which has close affinities with Hill Diarrhoea of India.

Lindeboom and Wientjes (p. 60) describe a patient with sprue complicated by a condition resembling tabes. The Wassermann reaction was negative and the authors think that the condition may have been due to deficiency of vitamin B.

Rietschel (p. 61) quotes the work of Verzar, who regards suprarenal hypofunction as the cardinal point in idiopathic steatorrhoea. He deals more particularly with coeliac disease, the Gee-Herter syndrome, of children, not with sprue as seen by physicians in the tropics. The treatment suggested is described. Rodríguez Olleros (p. 61) describes the results of gastroscopic examination of patients with tropical sprue. Atrophic gastritis similar to that seen in pernicious anaemia was the predominant lesion. It improved under liver extract therapy. Bing and Broager (p. 62) record the remarkably beneficial effect of nicotinic acid in the relief of the diarrhoea of idiopathic steatorrhoea. The other symptoms were not ameliorated to the same extent.

C. W.

Meira (João Alves). Espru' (noções atuais). [**Sprue. Present Views.**] —Reprinted from *Letras Médicas*. São Paulo. 1937. Vol. 2. No. 3. pp. 41–47.

An article of a general character, of the nature of a lecture on the subject, giving the geographical distribution, symptomatology and

clinical features, the pathology, diagnosis and differential diagnosis from idiopathic steatorrhoea and Gee's syndrome, prognosis and treatment. As the title indicates, the author gives a résumé of present-day knowledge but adds nothing fresh. *H. H. S.*

SPACEK (M. R. W.). **Sprue.**—*Irish Jl. Med. Sci.* 1938. Apr. 6th Ser. No. 148. pp. 171–183.

A general account of this condition containing, however, nothing that is not well known to readers of this *Bulletin*. Suitable for a student's lecture. *H. H. S.*

SALAH (M.). **Sprue in Egypt. Report of a Case.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. Nov. 30. Vol. 31. No. 3. pp. 351–358. With 1 chart. [12 refs.]

This is a clinical description of what is regarded as the first case of sprue in an Egyptian. The patient, a male of 40 years, was admitted with the provisional diagnosis of steatorrhoeic pancreatic disease or sprue.

The demonstration of marked glossitis, macrocytic anaemia and the chemistry of fatty stools excluded pancreatic disease.

The diagnosis of sprue was confirmed by the response of the condition to treatment and the increase of weight by 21 kgm. on appropriate treatment. This was based on the principles laid down by FAIRLEY—the production of alimentary rest by a suitable dietary, treatment of the anaemia by 300 gm. of liver *per os* followed by intramuscular injections of liver extract (2 cc. campolon for 15 days) and replacement of deficiency of gastric secretion by the addition of HCl in doses of 4 cc. t.d.s. for two months. The anaemia was of the hypochromic macrocytic type, with hypoblastic bone-marrow of megaloblastic characters, suggesting deficiency of both iron and haemopoietic principle.

The patient was kept under observation for fourteen months after discharge, during which time he remained normal.

P. H. Manson-Bahr.

STALDER (H.). Die einheimische Sprue. Ein klinischer Beitrag. [**Non-tropical Sprue—a Clinical Contribution.**]—*Schweiz. Med. Woch.* 1937. Nov. 13. Vol. 67. No. 46. pp. 1091–1093. With 1 chart.

The differential diagnosis of endemic sprue (or non-tropical sprue) from pellagra, Addison's disease, pernicious anaemia, tetany, osteomalacia, pancreatogenous diarrhoea and mesenteric tuberculosis has been placed on a secure basis by the work of Hess THAYSEN and the monograph of HANSEN.

Reference is also made to the newer work of VERZAR who has demonstrated experimentally a relationship between the suprarenal secretion and Vitamin B_2.

Few cases of non-tropical sprue have been recorded so far in Switzerland and according to Stalder they number twenty-seven in all.

Hansen has shown that many different degrees of severity of the same illness are encountered from slight cases with painless diarrhoea to the most severe with steatorrhoea, Addisonian pigmentation and anaemia of the pernicious type. Tetany and osteomalacia which are also noted suggest avitaminosis.

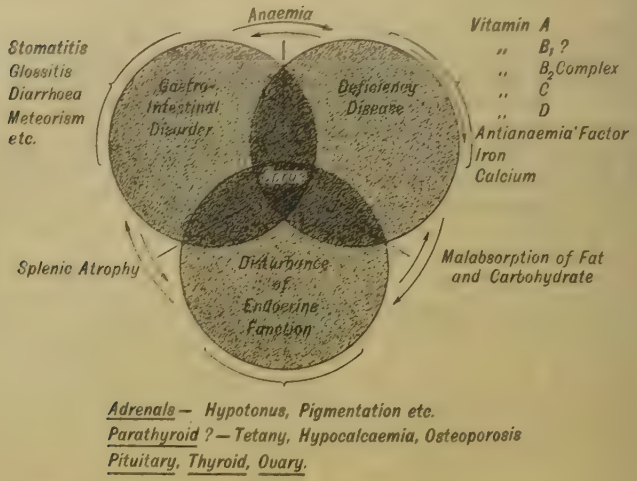
Two further cases are reported here. The first was in a man of 61 who exhibited symptoms of medium severity with fatty stools, emaciation, pigmentation and pernicious blood changes. Injections of Campolon produced a remarkable change in a brief period. The second was of a woman of 69. At first, on account of her severe condition and pigmentation, she was thought to be suffering from Addison's disease. The patient is still under treatment and a successful issue appears likely. She received a new yeast concentrate (made by the Physiological Institute in Basle) and of this she could assimilate 150–200 cc. a day. At the same time Campolon (5 cc.) every second day and occasional intravenous injections of Cortin (20 cc.) were also given. Campolon injections in the second case did not appear to exert the least effect either on the stools, the general condition or the blood picture. The injections of Cortin, either subcutaneously or intravenously, did not influence the size of the stools. Further trials with this preparation were carried out with difficulty on account of expense. The author considers that in endemic sprue probably a secondary B_2 avitaminosis is concerned. *P. H. M-B.*

ROHR (Karl). Die einheimische Sprue. [**Non-tropical Sprue.**]—*Deut. Ztschr. f. Verdauungs- u. Stoffwechselkrankr.* Leipzig. 1938. Vol. 1. No. 1. pp. 46–51. With 1 fig.

The author's remarks are based on twenty-two cases of "idiopathic steatorrhoea" seen by him in the University clinic, at Zurich. In nearly all the earliest symptoms were alimentary, which preceded systemic disturbance by six months or so, and it was the latter that led them to seek advice. The symptoms have been detailed so often, and they were typical in the author's patients; there is no need to repeat them here. He states, however, that the calcium content of the sprue stool is very high, not owing to deficient absorption but to the combining of the calcium with the unabsorbed fatty acids to form calcium soaps which are soluble with difficulty. He divides anaemias into four groups: 1. Cryptogenic pernicious anaemia, where Castle's principle is lacking—gastric anaemia, Biermer's disease. 2. Sprue anaemia, from interference with resorption of "anti-perniciosa" factors. 3. Anaemia of liver disease, in particular cirrhosis, when the antiperniciosa factor is not stored in sufficient amount. 4. Anaemia resulting from toxic conditions in pregnancy, diphyllobothrium infestation, etc.

Sprue—he is speaking, it would appear, of idiopathic steatorrhoea, non-tropical sprue—is explained as resulting from three coacting

factors: gastro-intestinal disorder, deficiency of vitamin, or iron, calcium, and Castle's principle, and disturbance of endocrine function. Of these the first is the most important. (See illustration.)



Illustrating the various factors which, in the author's opinion, interact to cause sprue.

[After a diagram in the *Deutsche Zeitschrift für Verdauungs- und Stoffwechselkrankheiten.*]

H. H. S.

VAN LEEUWEN (H. C.). De aetiologie van spruw, spruwoid en chronische enteritis. [**Aetiology of Sprue and of Sprue-like Conditions.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. Feb. 1. Vol. 78. No. 5. pp. 227–253. [53 refs.]

This is a discussion of the aetiology of sprue, of idiopathic steatorrhoea and of allied conditions and is followed by a report of ten cases. The author thinks that chronic amoebiasis, deficiency of gastric hydrochloric acid, psychological factors, disturbances of endocrine glands as well as a damp and cool climate are all of importance in the causation of sprue and of sprue-like conditions. He considers idiopathic steatorrhoea to be primarily due to allergy of the small intestine and he compares the condition with vasomotor rhinitis. Pathologically there is a swelling of the intestinal mucous membrane which produces the picture of chronic enteritis with an acceleration of the passage of intestinal contents. Owing to changes in the small intestine the absorption of vitamins is impaired and this leads to other symptoms of sprue such as stomatitis. Therapeutically the author obtained good results with intravenous injections of calcium.

H. Lomas.

BARKER (W. Halsey) & RHOADS (C. P.). **The Effect of Liver Extract on the Absorption of Fat in Sprue.**—*Amer. Jl. Med. Sci.* 1937. Dec. Vol. 194. No. 6. pp. 804–810. With 4 figs.

Some disturbance of fat absorption from the intestinal tract in patients suffering from sprue has always been assumed to be an integral part of the disease.

Previous studies on the fat content of sprue faeces have suggested that it is largely split, thus indicating that it is not one of pancreatic function. It is not clear, however, whether the sprue diarrhoea is to be regarded as caused by the mal-absorption of fat or whether it is the direct result of the presence of so much unabsorbed split fat in the intestines.

In previous communications CASTLE, Rhoads, LAWSON and PAYNE have described the improvement of the intestinal symptoms of sprue patients which follows the suitable administration of liver extract, whilst MACKIE, MILLER and Rhoads have demonstrated characteristic alterations of motility and outline as seen by X-ray examination and that these alterations become less pronounced subsequent to injection of liver extract.

In the present communication the amount of fat in the blood of normal subjects following the taking of a meal rich in fat is compared with that in patients during exacerbations of sprue diarrhoea as well as during the remissions which follow the administration of liver extract.

The method employed for the determination of the blood lipids was that described by KIRK, PAGE, and VAN SLYKE. Heparin was employed as an anticoagulant. The subjects fasted overnight and a sample of blood was taken before the test meal of fat. After repeated studies it was found that little or no change in the levels of free and total lipid cholesterol occurred after the fat meal.

The amount of lipid in the blood of four normal individuals before and after taking a fat meal was measured by the Kirk method. The results were remarkably constant, the fasting levels of total lipid carbon were in the range between 320–480 mgm. per cent. The peak of the rise was reached at the end of four hours and the maximum level attained was between 550–650 mgm. per cent. The results obtained from the study of the normal individuals were in agreement with those reported by Kirk, Page and van Slyke.

Subsequently the amount of lipids was ascertained in three cases of sprue before and after treatment with liver extract, and in two cases before treatment. All five were typical cases of sprue acquired in the tropics and of long duration. During the preliminary period of not less than four weeks all sprue patients were given a diet which contained almost no fat and limited carbohydrates, but which was rich in protein and fresh fruits.

The amount of lipid in the blood of all five cases showed practically no increase following a fat meal. This fact, coupled with the well-known observation that a large amount of fat is present in the intestinal contents, seems to be adequate evidence that the absorption of fat is interfered with in the active phases of the disease, even though anaemia and stomatitis are not present. The three cases were tested again after treatment with liver extract injected intramuscularly and showed wholly different amounts of lipids in the blood. In one case one injection of liver (10 cc., Lilly NNR derived from 50 gm. of

liver) was sufficient, whereas in other cases several injections repeated daily were required. In all three cases a pronounced rise in the level of the total lipid carbon resulted. The resulting curve approached normal in both duration and height and presented a striking contrast to the practically flat curves obtained before treatment.

It seems to be clear that normal individuals react to a meal containing 2 gm. of fat per kilo. of body weight by a pronounced and well-sustained increase of the amounts of lipid in the blood. Patients with sprue who still manifest symptoms after treatment with a diet low in fat content exhibit no such increase under similar experimental conditions.

The passage of loose bulky stools follows the taking of a test meal of fat before treatment with liver extract, but this does not occur during the 6-hour period of the test, but only 12–48 hours after the experiment has been terminated. The time relationship of the diarrhoea to the withdrawal of blood samples for analysis suggests that the lack of increase of the content of the blood lipid cannot be ascribed to the loss of fat from the intestinal canal, but to actual failure of absorption by the intestinal mucosa. The view is gaining ground that malabsorption results in diarrhoea rather than that the diarrhoea is the cause of the malabsorption. *P. H. M-B.*

Hopman (B. C.). Over de aetiologie van tropische spruw en verwante ziekten. [**The Causation of Tropical Sprue and Allied Diseases.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. Apr. 19. Vol. 78. No. 16. pp. 904–914.

Many explanations are current regarding the causation of tropical sprue. There are: an infection theory, a vitamin theory, an antecedent intestinal disease, adrenal cortical insufficiency and hypersusceptibility of the small intestine. Treatment of the disease goes hand in hand with the theory adopted and therefore the importance of the theory in the case of sprue is very obvious. The author approaches the subject by a very full consideration of basal and active metabolism for each of the standard constituents of food and lays great stress on disturbance of metabolism in the European who is transported to the tropics. The whole of this argument need not be set out. A European finds himself in a warm climate and his basal metabolism falls. In spite of this his temperature is raised by half a degree. He must then reduce his active metabolism in order to compensate for this rise of temperature, that is to say, he takes less exercise and uses his muscles less. Correspondingly his consumption energy should be lowered. Now the native has long ago adjusted himself to metabolic requirements, but it is difficult for the European, more or less suddenly, to make the necessary alteration of his use and wont. One sickness or another is apt to develop in consequence of the disturbance of carbohydrate and fat metabolism.

A summary of the findings of the author may be given. For every latitude there exists an appropriate basal and active metabolism. If carbohydrate and fats are taken in too large quantity for metabolism or are insufficiently utilized various possibilities arise: 1. There develops sunstroke, an acute disease in which suddenly too few calories are used up and the man dies of overheating. 2. There develops summer diarrhoea in sucklings for the protection of the infant by excretion of undigested food, which has been ingested in

too large quantity. 3. There develops obesity. A too large intake of food, developed through excessive function of the digestive organs, results in the deposit of too much fat under the skin and in the organs. 4. There develops diabetes. This usually occurs after the appearance of obesity. A dysfunction succeeds the hyperfunction of pancreas and liver. Insulin, which is produced in too small quantity, is no longer able to retain glycogen in the liver. 5. There develops sprue. After hyperfunction of the liver and pancreas comes a dysfunction of both organs, but mainly of the liver. Bile acids are excreted in insufficient amount and the fats are badly absorbed.

Obesity, diabetes and sprue are the safety valves which protect the organism against overheating. If the body is forced to a metabolism which is beyond its powers obesity will result or, it may be, a more serious disease still. The treatment to be adopted is moderation in food and a sufficiency of exercise. *W. F. Harvey.*

Jelke (Hugo). Om sprue i anslutning till ett fall av idiopatisk steatorrhé hos vuxen. [**Sprue and Idiopathic Steatorrhoea.**]—*Hygiea.* 1938. July 31 & Sept. 14. Vol. 100. Nos. 14 & 15. pp. 529–568; 577–629. With 6 figs. [66 refs.] German summary.

The author describes a case of what he designates "idiopathic steatorrhoea" or "sprue nostras" in a man of 39 years, who exhibited the symptoms of tetany. The blood phosphorus was about normal, but the calcium was only 5 mgm. per cent. when he first came under the author's observation, and he was very emaciated. Under treatment with a fatless diet, liver and "calcinat," he improved much; the calcium rose in a few days to 6 mgm. and in another 3 weeks to 11·2 mgm. Cramps and tetany ceased after a week, and he put on 4·6 kgm. in weight. Three months later he was attacked with a dry pleurisy and, though the intracutaneous tuberculin reaction was negative, X-rays showed small, central calcifications. He continued to make satisfactory progress, but after about a year he stopped taking any more treatment, the cramps returned and a few months later he died with "inflammation of the lungs."

This case is made the text for a long discussion and much quotation of literature regarding the similarities and differences between tropical sprue, idiopathic steatorrhoea, coeliac disease, their cause and treatment, but no fresh views are presented. *H. H. S.*

Pesce (Hugo). Un caso de sprue tratado "a la antigua" y el sindrome espruiforme "Chahuatam Akan" en Andahuaylas (Apurimac-Perù). [**A Case of Sprue treated in the Old Way. "Chahuátam Akan," a Sprue-like Condition in Peru.**]—*Rev. Méd. Peruana.* 1938. Jan. Vol. 10. No. 109. pp. 9–27.

The patient was an unmarried half-breed, aged 32, living in the hilly region of Cuzco. He stated that he suffered from diarrhoea, 3 or 4 motions daily, copious, yellowish-white, fatty, frothy, with slight tenesmus and no fever. These attacks were separated by intervals of good health [the length neither of attack nor healthy interval is mentioned]. Examination showed pallor and anaemia, sprue-like tongue. There was no laboratory available, so the blood changes

cannot be detailed. Treatment by milk brought about great amelioration in a month, and 18 months–2 years later there had been no relapse.

In connexion with this case the author describes and discusses a syndrome known as *chahuátam ákan* [which seems to mean the passage of stools of undigested food] a form of diarrhoea with pasty stools, meteorism, weakness and anaemia among those living at higher altitudes and particularly at the rainy season and affecting chiefly males. It is common in the Department of Apurimac, Peru. It has close affinities with Hill Diarrhoea of India. *H. H. S.*

Lindeboom (G. A.) & Wientjes (J. E. B.). Pseudotabes bij spruw. [**Pseudotabes in Sprue.**]—*Nederl. Tijdschr. v. Geneesk.* 1938. May 7. Vol. 82. No. 19. pp. 2260–2266. English summary. [19 refs.]

If in pernicious anaemia a subacute combined degeneration of the cord can occur, it might be expected that in sprue, with its hyperchronic anaemia, such neurological symptoms would also occur. Little mention of such symptoms is to be found in the literature. A case is brought forward by the authors in which symptoms very suggestive of tabes dorsalis were present along with apparently clear sprue. The patient, an unmarried woman 58 years of age, had spent some time in Java a number of years previously but had remained well there except for one day's mucous diarrhoea. At the time of the present examination she was emaciated and her face of brown colour like Addison's disease. There were atrophic glossitis, a macrocytic anaemia and a fat diarrhoea, making the diagnosis of tropical sprue a very likely one. While this was fairly established, it was the nervous syndrome which proved interesting. Patellar and tendo Achillis reflexes were absent, as also were the plantar and abdominal reflexes, while the tendon and periosteal reflexes of the upper limbs were sluggish. On the other hand, except for a slight temporary hypalgaesia, there was no loss of surface or deep sensibility. It seemed possible then that, not a subacute combined degeneration of the cord but a peripheral neuritis might account for the symptoms, but there was no trace of reaction of degeneration. More interesting still were the pupillary reactions. One pupil was of medium diameter, the other was narrowed and there was a definite Argyll-Robertson phenomenon. One explanation of the case would be that there was present a combination of tabes and sprue, but the Wassermann reaction was negative and examination of the cerebrospinal fluid gave no support to that suggestion. Then again it is known that pupillary disturbances are a common symptom in chronic alcoholism. But here the question arises how far that symptom is to be attributed directly to alcohol and how far to an avitaminosis B dependent on gastritis and defective absorption. This brings the authors to the main point of their thesis, that neural symptoms and even an Argyll-Robertson pupil should at least be looked for as a manifestation of vitamin B deficiency.

In this particular case treatment with diet and liver cured the sprue but even parenteral administration of vitamins B_1 and B_2 failed to make any impression on the neurological syndrome.

W. F. Harvey.

Rietschel. Zur Pathogenese und Therapie der Sprue, insbesondere der Sprue der Kinder [Coeliakie] (Gee-Herter-Heubnersche Erkrankung). [**Pathogenesis and Therapy of Sprue with Special Reference to Sprue of Children (Coeliac Disease, Gee-Herter-Heubner Disease).**]—*Deut. Med. Woch.* 1938. Jan. 14. Vol. 64. No. 3. pp. 73–78.

[The terminology which we in English-speaking countries recognize as Coeliac Disease appears to present considerable difficulties to Continental writers. The plea to term the syndrome "Sprue der Kinder" (child sprue), will have few supporters and fewer still to add another cognomen in honour of Hess Thaysen, Hansen and V. Staa, who have striven to unite all the steatorrhoeas under one heading. We venture to think that hardly a single pediatrician in English-speaking countries will be found to support the view that coeliac disease in children and sprue in the adult are in fact the same disease.]

In this paper no new observations are made, but it is a restatement of all the various theories which have been adduced from time to time. The theory of bacterial infection or vitamin deficiency finds few supporters. The work of Verzár (on animal experiments) is discussed at length. As is well known, this authority has shown that the absorption of sugar through the intestinal wall is dependent upon the functions of the suprarenals—in the adrenalectomized animal the fat which is split in the intestines is no longer synthesized so that the animal does not grow mainly because it lacks lactoflavin—a kind of pro-vitamin—and can no longer create the active flavin-phosphoric acid which is a ferment necessary for respiration. Verzár has applied this knowledge to sprue (or more accurately idiopathic steatorrhoea) and looks upon the suprarenal as the vital point in this disease and he believes that he can explain the whole symptom complex of sprue by a hypofunction of the suprarenals, of the cortex as well as the medulla, therefore lactoflavin (B_2) and the cortical hormone in large doses are recommended as therapeutic agents. The author believes that he can combine the various theories of Thaysen, Hansen and Verzár into some intelligible system of therapeusis.

The cardinal therapeutic indications are to overcome the overwhelming bacterial preponderance in the small bowel, the restoration of the normal bactericidal action and the neutralization of acidosis.

It is intelligible that one can restore the normal hormone interchange by the addition of vitamins in avitaminotic disturbance. As a means of restoring the normal intestinal function, especially in children, the use of human milk is advocated, a matter which he thinks has been much neglected. The administration of albumin has also a favourable action and a pure fruit and apple diet (pektin) is also advocated.

P. H. M-B.

Rodríguez Olleros (Angel). **The Stomach in Tropical Sprue.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1938. June. Vol. 13. No. 4. pp. 503–521. [11 refs.] [Spanish version pp. 485–502.]

The present paper is concerned with the results of 28 gastroscopic examinations in as many patients suffering from tropical sprue. The investigated cases were divided into "complete," "incomplete" and "latent" types, but in every instance, at one time or another, each patient had shown all the features which are accepted as

characterizing the fully-developed sprue syndrome. The predominant lesion demonstrated by gastroscopy proved to be some type of atrophic gastritis; sometimes it was generalized and at other times only a limited area of the stomach was implicated. The gastroscopic findings were similar to, though less intense than, those described in pernicious anaemia, and the atrophy of the gastric mucosa was regarded as developing secondarily to the syndrome of sprue and the anaemia. The condition improved with liver extract therapy in much the same manner as has been found in pernicious anaemia.

N. Hamilton Fairley.

Bing (J.) & Broager (B.). Undersögelser over virkningen af nikotinsyre-indgift paa to patienter med idiopatisk steatorrhoe (sprue). [**Investigations of the Action of Nicotinic Acid Medication on Two Patients with Idiopathic Steatorrhoea (Sprue).**]—*Ugeskr. f. Laeger.* 1938. Vol. 100. pp. 1131–1137. With 3 figs. [54 refs.]

This Danish study shows the remarkably beneficial action of nicotinic acid in sprue which has of late been found to be by no means rare in Denmark. The authors give an account of two patients, women of 49 and 28 respectively, who suffered from well-defined idiopathic steatorrhoea. Not only did the diarrhoea cease with the administration of nicotinic acid [as is usual in the diarrhoea of pellagra] but it also recurred when this drug was discontinued. The improvement in the other manifestations of the disease—emaciation, meteorism, stomatitis, anaemia, low blood-pressure, pigmentation, a flat blood-sugar curve, hypocalcaemia and osteoporosis—was by no means so marked. [That tropical sprue and idiopathic steatorrhoea of temperate climates are the same is by no means proved at present.]

C. Lillingston.

Junior (Peregrino). Sprue, doença de carencia. [**Sprue a Deficiency Disease.**]—*Brasil-Medico.* 1937. Aug. 28. Vol. 51. No. 35. pp. 901–903.

Castellani (Aldo). **Sprue and Pernicious Anaemia.**—*Jl. Trop. Med. & Hyg.* 1937. Nov. 15. Vol. 40. No. 22. pp. 281–284.

MEDICAL AND SANITARY REPORTS.

UGANDA PROTECTORATE (1937).

The Uganda Protectorate lies in the northern part of the Great Lakes region of Africa. It has no sea coast, being bounded by the Anglo-Egyptian Sudan on the north, Kenya Colony on the east, Lake Victoria Nyanza and the Tanganyika Territory on the south, and the Belgian Colony on the west. The area of the Protectorate is estimated at 94,204 sq. miles, including 13,616 sq. miles of water. (The area of England without Wales is a little over 50,000 sq. miles.) The headquarters are at Entebbe and the chief commercial towns are Kampala and Jinja. All three are on or near the north shore of Lake Victoria.

Vital Statistics.—For the native population only, the principal facts are as follows :—

Province	Estimated Population	Live Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Buganda ...	888,244	20,073	22·6	16,004	18·0	1,593	79·4
Eastern ...	1,189,204	29,977	25·2	26,141	22·0	5,188	173·1
Western ...	741,281	19,010	25·6	11,921	16·1	2,494	131·2
Northern ...	807,820	23,009	28·5	14,669	18·2	5,057	219·8
Protectorate	3,626,549	92,069	25·4	68,735	18·9	14,332	155·7

The above figures summarize the excellent Tables which provide data in great detail for both Provinces and Districts in the Protectorate.

European Officials resident numbered 595 with an average number resident of 499. One invaliding and four deaths were recorded. Among European *non-officials* 1,837 cases of sickness were treated by Government Medical Officers, *malaria* accounting for 371 of the cases dealt with, *injuries* 113 and *diseases of the digestive system* 110 ; there were 16 deaths recorded among European non-officials.

Asian Officials resident numbered 387 with an average number resident of 323 ; three were invalided but no deaths were recorded. The Government Medical staff treated 8,124 cases of sickness among Asian *non-officials*, and 75 deaths were reported within this group.

African Officials (African Civil Service) resident numbered 212 with an average number resident of also 212. There were no invalidings, but one death occurred within this group.

Among all groups of officials and non-officials *malaria* was the principal cause of ill-health.

Maternity and Child Welfare.—Though the Provincial and District infant mortality and maternal mortality rates have been subject to variation during the past seven years, for the Protectorate as a whole these rates have declined steadily and testify to the efficacy of ante-natal and child welfare work in the territory. It is said that little progress has been made in increasing the number of maternity centres, yet despite this and other handicaps the tabulated facts supply ample evidence not only of the considerable volume of work dealt with but also of the success achieved in this important field. For example, during the year under review 16,676 women attended for ante-natal supervision

at the larger centres, 1,745 of them terminated their pregnancies in hospitals or at maternity centres and among them 1,576 live births and 62 maternal deaths were recorded. On the other hand a further 484 women who had not availed themselves of ante-natal treatment were delivered in hospitals of 311 live babies with 42 maternal deaths. The figures for those who did not attend for ante-natal supervision again compare unfavourably with those who did. Then again, 2,116 women after attending ante-natal centres were reported to have been confined in their own homes where they gave birth to 2,024 live babies with only 16 maternal deaths. *Infants attending Welfare Centres* numbered 17,792; these figures relate only to healthy children brought to the centres for advice and supervision—sick children are included in hospital and dispensary returns.

Patients admitted to the wards of the *Lady Coryndon Maternity School* numbered 569; during the year 410 confinements, 312 live births, 14 infant deaths and 33 maternal deaths were recorded. The Out-patient Department dealt with 2,948 expectant mothers and undertook the post-natal supervision of 651 babies. At 22 country centres there were 1,609 confinements, 1,523 live babies were born, infant deaths numbered 37 and maternal deaths 6; at these centres 11,184 new ante-natal cases were dealt with, 13,899 attendances were recorded at child welfare clinics, and total out-patient attendances were 68,742.

To the wards of the *Nsambya Maternity Training School* 371 patients were admitted, confinements numbered 295, live births 260, while 16 infant deaths and 10 maternal deaths were recorded. At 15 country centres confinements totalled 1,906, live births 1,805, infant deaths 23 and maternal deaths 11; records at these centres also include mention of 4,272 new ante-natal cases, 2,892 attendances at child welfare clinics, and 37,872 out-patient attendances.

With regard to the *training of nurses and midwives* at the Lady Coryndon Maternity Training School, of the 39 students in training, 14 were successful in obtaining the Certificate of the Uganda Midwives Board, and at the Nsambya Maternity Training School, 7 of the 30 native students in training obtained this qualification. There are now 63 European and Asian and 217 African Midwives on the registers of the Uganda Midwives' Board. It remains to add that during the year a district midwife was posted to the township of Hoima for special ante-natal work among native women. If this experiment proves successful it may lead to extension of trained supervision of maternity work among African women with corresponding decrease in obstetrical disasters.

School Hygiene.—Periodic visits of inspection continued to be made to schools in most districts by Medical Officers and their assistants (see this *Bulletin*, 1938, Supp., p. 57*). In Busoga the Senior African Medical Assistant examined the pupils at Mwiru College; treatment was provided where necessary. The experiment in nutrition in the Mengo District (see this *Bulletin*, 1938, Supp., p. 57*) was concluded with the most encouraging results. In an Appendix to the Report under review, Drs. J. Scott Brown and L. J. A. Loewenthal report the results of the investigation under the title of "*The Value of Milk as an Adjuvant to the Diet of School Boys.*" After a routine examination of the boys attending the C.M.S. School at Mukono, 30 were chosen at random and each given half-a-pint of milk on every day of attendance. Briefly, results show a significant extra gain in

height, that the small superiority in weight gain was not statistically significant, and that optimum nutrition is not obtainable from normal African diets. A fuller account of the investigation appeared in the *East African Medical Journal*. The investigation continues and a similar experiment is in progress at Teso.

Public Health, Sanitation, etc.—No new schemes of development were introduced during the year; the policy outlined in 1934 (see also this *Bulletin*, 1937, Supp., pp. 46–47*) was, however, steadily pursued, and of this it is said that in certain places the first fruits are beginning to appear. Considerable progress is reported with the Kampala *sewerage system*, and though the disposal works are not yet completed a number of houses have already been connected up to the sewers. Several houses in Entebbe have septic tank installations, though these cannot be brought into use until the piped water supply from Lake Victoria has been completed; Government houses in Mbale also have septic tank installations operated in connexion with the newly constructed gravity water supply. In Government quarters in Fort Portal the double bucket system is in use, and in the larger and some of the smaller townships, the single bucket system is used. Dr. W. H. Kauntze, C.M.G., Director of Medical Services, contributes an interesting commentary on rural sanitation and of how sanitary ideals are to be realized in spite of inherited native beliefs. The provision of a filtered and chlorinated piped *water supply* was partially completed in Mbale and in Entebbe, while in rural areas the protection of water supplies continued to receive special attention.

With regard to *housing and town planning*, it is reported that new Asian dwellings are being built to better design, that building rules are strictly enforced, and that Africans are gradually developing an interest in model housing schemes. The provision of cheap housing for Africans is a problem of urgency in the townships, where efforts are being made to improve living conditions by laying out plots in areas zoned for certain classes of housing. A detailed description is given of a two-roomed house suited to the needs of the general African population and costing between £20–£25 to build. A Committee has been appointed to investigate *labour conditions* in Uganda; meanwhile the standard of housing of labourers is said to improve.

The question of *food in relation to health and disease* is receiving special attention. The Report of the Nutrition Sub-Committee of the Agricultural Survey indicates that large sections of the population suffer from malnutrition; steps have already been taken with a view to improving existing conditions (see the experiments with milk diets under *School Hygiene* above). Agricultural surveys continue to be made to determine the quantity and quality of locally grown foodstuffs, while selected youths are trained in improved farm methods at farm schools at Lira and Gulu. Rules for regulating the sale of *milk* are in course of preparation.

Health propaganda continues to be carried out in all districts, with encouraging results.

The training of African Sanitary Inspectors has progressed satisfactorily (see this *Bulletin*, 1938, Supp., p. 58*), and the final examination of the first batch of students will take place in November 1938 under the auspices of the Royal Sanitary Institute, London.

Hospitals, Dispensaries, etc. (see also this *Bulletin*, 1938, Supp., p. 59*). The Tororo Hospital which will provide in- and out-patient accommodation for Asians and Africans, approaches completion.

To the Jinja Hospital, two new African wards, an Asiatic Maternity Ward, out-patient block, and other constructions were added. Minor improvements were carried out to other hospitals in the Protectorate. Three new dispensaries and two additional dressing posts were opened during the year.

The training of African female nurses continues at the hospitals at Namirembe and Mulago with successful results.

The records of the year's work at hospitals and dispensaries is summarized below :—

Hospitals, etc.	Beds	Admissions	Treated	Deaths	Total New Cases	Total Re-Attendances
4 European ...	34	538	—	—	} 499,934	533,727
9 Asiatic ...	56	1,655	—	—		
23 African ...	1,277	31,250	—	—		
97 Dispensaries	625	?	—	—	588,727	1,152,941
Totals ...	1,992	33,443	34,487	1,799	1,088,661	1,686,668

A new nomenclature has been adopted for the tabulation of diseases and deaths in the Uganda Annual Medical Reports. This new departure permits the presentation of the relevant facts within the limits of *three pages* in place of the 13 pages formerly necessary for this section.

Medical Education.—The Report of the Commission appointed by the Secretary of State for the Colonies to advise on higher education in East Africa, drew attention among other matters to the fact that the basic education of the African recruit to the medical course is very deficient, and that his knowledge of the preliminary sciences is not of a sufficiently high standard. To meet these requirements the new biology, chemistry, and physics laboratory under construction at Makerere College should enable the standard of these courses to be raised considerably. A new building is to be erected to replace the present medical school which lacks adequate accommodation.

The Report of the Uganda Medical School describes the year's work and presents details of the numbers of students taking the various grades of examination, results of those examinations, and the more significant comments made by the external examiners. It is noted that since 1923 thirty-five students have been licensed to practise and 30 of these are in the service of the Uganda Government.

With regard to *morbidity experience* during the year it is stated that with the exception of malaria and blackwater fever, a general decrease in the incidence of the major communicable and infectious diseases was noted during 1937. The notes which follow briefly summarize more extensive commentaries in the Report relating to the principal diseases dealt with at hospitals and dispensaries.

A further increase in the number of *malaria* cases is reported, *viz.*, 72,238 as compared with 71,407 in the preceding year (see this *Bulletin*, 1938, Supp., p. 59*). Of the total cases recorded 31,314 were dealt with at station hospitals and 40,924 at dispensaries, while at all centres approximately 50 per cent. of the cases were microscopically diagnosed. On the other hand the "Return of Diseases and Deaths" shows that 32,142 in- and out-patients were treated for the

disease, the distribution of types of infection being, *benign tertian* 1,997, *quartan* 1,304, *subtertian* 7,800, and *unclassified* 21,041; hospital deaths ascribed to the disease numbered 134. The usual routine anti-malarial measures continued to be carried out at most stations, with reclamation of swampy areas, sub-soil drainage, controlled tipping and other works in specific areas.

Of *blackwater fever* 170 cases and 43 deaths were reported, and of these 86 cases with 23 deaths were treated by Government Medical Officers, and the remainder by private practitioners. Of the total cases 14 were European (4 deaths), 150 Asians (38 deaths) and only 6 African, with 1 death. The incidence and distribution of blackwater fever in Uganda is set out in great detail in an admirable series of tabulated statements with distinction as to race, province, district, age, etc.

No case of *yellow fever* was reported during the year. In view of the suspicious cases reported by the District Medical Officer, Masaka, in 1936, that District first engaged the attention of the *Yellow Fever Commission* of the Rockefeller Foundation (see this *Bulletin* 1938, Supp., p. 60*). No cases of clinical yellow fever were seen, while sera from 35 cases of fevers of undetermined origin when inoculated into animals gave negative results. Protection tests were carried out; sera from 37 children all gave negative results, but 6 from 174 adults were positive. The Commission continued investigations in the Bunyoro, Chua and West Nile Districts of the Northern Province with somewhat similar results. In Bwamba County of the Toro District (Western Province) 25 sera from 53 adults gave positive findings. Protection tests were carried out on 141 people of all ages—sera from 16 were positive. Results suggest that a jungle type of yellow fever may be present in Bwamba. Measures to combat *Aëdes aegypti* were continued. The Government Entomologist reports that investigations into the incidence of *Aëdes aegypti* were carried out in rural areas in the West Nile District, and in the vicinity of Kampala; these investigations continue.

It is said that *plague* appears to be undergoing its periodic fall in incidence and that the decrease in the number of cases during 1937 is not due to any real improvement in its control which "will only become effective when the African builds for himself a house which contains no real harbourage for rats, and adopts habits of food storage and refuse disposal which deprive the rodent of any food." During the year under review 515 cases with 478 deaths were recorded, and of these 371 cases with 338 deaths occurred in the Eastern Province, and 112 cases with 108 deaths in the Mengo District of Buganda Province. Cyano-gassing of infected huts continues as a routine measure, but de-thatching of infected huts has been applied more extensively. At the Laboratory 377 smears were examined for the presence of *P. pestis*, but findings are not recorded. The Government Entomologist reports that tests carried out with ferrets for the destruction of rats (see this *Bulletin*, 1938, Supp., p. 60*), were unsatisfactory, the size of the male animals preventing them from reaching places accessible to the rodents; two female ferrets are to be tried. Rat and flea surveys were carried out in various areas.

Of *relapsing fever* 453 cases were reported, but total deaths due to this cause are not stated. Of the total cases 375 were microscopically diagnosed and 367 were treated in hospitals, with 25 deaths. The Government Entomologist experimented with various larvicides for

the destruction of *O. moubata*; these tests continue. Five cases of *typhus* were recorded. The value of the Carnie disinfestor in controlling the disease is again emphasized (see this *Bulletin*, 1936, Supp., p. 47* and 1937, p. 49*). There were 310 cases of *cerebrospinal meningitis* with 118 deaths. The disease appears to be endemic in the Western Province and Masaka (Buganda Province), while sporadic cases occurred in other areas. All the cases (72) reported from Busoga (Eastern Province) are stated to have occurred in immigrant labourers. Segregation of contacts in temporary shelters has been continued (see this *Bulletin*, 1938, Supp., p. 61*).

No case of *smallpox* was notified but the vaccination campaign was continued, 587,525 vaccinations were performed during the year, and it is said that over 75 per cent. of the total population are now protected. Attention is being directed towards maintaining immunity by vaccinating all children at schools inspected by Medical Officers.

Trypanosomiasis.—During the year under review only 728 new cases with 14 deaths were reported. The decline in incidence by comparison with 1936 experience is striking, but it is noted that the disease remains a major problem in the West Nile District where 700 of the total cases and 8 deaths occurred during 1937. The Koich River area of the West Nile District has suffered such serious depopulation through the gradual voluntary movement of the people southwards, that it is doubtful whether the small numbers of inhabitants remaining will be sufficient to maintain the clearings at the river crossings. The movement of people to new areas has served to increase the incidence of trypanosomiasis in those areas, and has introduce new difficulties and problems to be dealt with. Control measures were maintained as previously described (see this *Bulletin*, 1938, Supp., p. 61*), particular attention being paid to the experimental "rod-clearings" which are clearings 10–20 yards wide along the banks of a stream designed to reduce fly density to limits within which the risks of infection become very small. The *pass system*, allowing natives to travel between Uganda and the Sudan along certain defined routes, was introduced during the year and has functioned successfully; illicit movements of people have been converted into controlled movements with examination of travellers at certain gland posts. The pass system over the Tanganyika-Uganda border is being maintained.

The Government Entomologist completed his tsetse fly surveys of the Gulu District; it was recommended that re-population of the restricted areas must be carried out gradually and under strict administrative control. The clearings in the West Nile and Madi areas (Northern Province) were also visited.

Cases of *tuberculosis* (all forms) among in- and out-patients dealt with at Government hospitals totalled 613 and of these 520 were cases of the *pulmonary* type of the disease. Hospital in-patient cases were pulmonary tuberculosis 283 with 92 deaths, other forms of tuberculosis 57 with 20 deaths. The investigations of Dr. CARMICHAEL, Senior Veterinary Research Officer, were continued. During the year 51 specimens of sputum from phthisis patients were examined, the causal organism in all cases being of the human type; it is observed that among upwards of 250 specimens of sputum examined up to the end of 1937 four were caused by the bovine type of bacillus. With regard to other respiratory ailments, the *pneumonias* were responsible for 2,038 cases and of these 1,665 were treated as hospital in-patients

and 369 died. *Bronchitis* was responsible for 6,777 cases, of which 439 were in-patients and 6 died.

At Government hospitals 102 patients were treated for *typhoid fever* with 31 deaths, and 8 for *paratyphoid fever* with 1 death. A small epidemic which broke out in Kampala was traced to a polluted water supply; a piped water system was brought into use and the outbreak ceased within 14 days. *Dysentery* gave rise to 2,023 cases with 58 deaths, the distribution of types of infection being amoebic 652, bacillary 281, and unclassified 1,090. It is also noted that the returns show 6,231 cases of *diarrhoea and enteritis* and 29,147 cases of *other diseases of the digestive system.*

Helminthic diseases, especially infections with *ascaris* and *ancylostoma*, are said to occur widely. Infected persons are treated with anthelmintic drugs, but re-infections are frequent by reason of insanitary habits; preventive measures are directed mainly towards the provision of latrines and educational propaganda. Of *ankylostomiasis* 1,761 cases were recorded during the year; the results of stool examinations by Medical Officers in seven areas showed infection rates ranging between 23 and 77 per cent. The condition though widespread is said to be the cause of little disability. *Taeniasis* is common in the Western Province and in districts where animal husbandry is an important industry; 2,034 cases were dealt with in Uganda during 1937. *Dracontiasis*, of which 639 cases were recorded, is again said to be confined to the Nilotic districts of the Northern Province; efforts are being made to provide protected water supplies. *Ascariasis* gave rise to 861 and *schistosomiasis* to 126 cases, during the year under review. No cases of *filariasis* were treated in hospitals, but *Onchocerca volvulus* is said to be extremely common in the Sezibwa river area of Buganda, while the infection is also said to be common round the head-waters of the Nile.

Venereal Diseases show increased incidence. The incidence and distribution of *syphilis* and *yaws* read as follows:—

Province	Hospital Cases		Dispensary Cases	
	Syphilis	Yaws	Syphilis	Yaws
Buganda	11,981	992	19,230	2,062
Eastern	10,971	3,918	11,718	6,780
Northern	1,821	12,701	1,666	11,245
Western	2,189	4,673	8,045	22,987
Totals ...	26,962	32,284	40,659	43,074

The distribution of *gonorrhoea* is not given, but the 16,236 cases treated are an increase over 1936 records. The results of treatment are said to be unsatisfactory owing to the irregular attendance of patients.

Leprosy.—At Government hospitals and dispensaries 1,067 lepers attended for treatment during the year under review. The Reports of the *Mission Leper Colonies* testify to the admirable work which continues to be carried out at these institutions; from these Reports the following details have been extracted:—

Leper Colony	Supervised by	Inmates
Buluba, Busoga	Franciscan Sisters ...	88
Nyengo, Mengo	„ „ ...	208
Bunyoni, Kigezi	Church Missionary Society	547
Kumi Children's Home, Teso ...	„ „ „	354
Ongino	?	411

Other diseases mentioned in the Official Returns include 2,403 cases of *trachoma*, which still remains an important cause of blindness in Uganda; *other diseases of the eye and annexa* were responsible for 11,725 cases. Out of 53,289 cases of *affections of the skin, cellular tissue, and organs of locomotion*, no less than 35,059 were due to *tropical ulcers*; this condition was commented upon in the 1936 Report (see this *Bulletin*, 1938, Supp., p. 63*). For *rheumatic conditions* 20,081 patients received treatment, *nephritis* gave rise to 2,927 cases and 82 deaths, while 48,725 patients were treated in the group *external causes*.

Scientific.—The Laboratory Report records that examinations carried out during the year totalled 50,464. The numbers of specimens received and examined are grouped under various headings, *parasitology*, *serology*, but findings are not recorded. The Report of the Government Entomologist has already been referred to in the above summaries.

Scientific papers published by members of the staff of the Medical Department include the following:—

Loewenthal (L. J. A.). A note on Tick-typhus in the Eastern Province of Uganda.—*East African Med. Jl.* 1936. Vol. 13. p. 141.

——. The place of logic in Medical Education.—*East African Med. Jl.* 1936. Vol. 13. p. 204.

——. Diseases of the Skin in Negroes.—*Journal of Tropical Medicine & Hygiene* from September 1936 to December 1937. A series of articles published at various times.

——, de Courcy-Ireland (M. G.) and Hosking (H. R.). A survey of Health and Agriculture in Teso, Uganda.—Uganda Government Press, Entebbe.

Gibbins (E. G.). Notes on the Breeding Habits of some House Frequenting Flies in Uganda.—*East African Med. Jl.* 1937. Vol. 13. p. 318.

Roberts (C. E.). Peptic Ulcer in Uganda.—*East African Med. Jl.* 1937. Vol. 14. p. 88.

Barratt (R. E.). A Portable Steam Disinfestor.—*East African Med. Jl.* 1937. Vol. 14. p. 132.

——. An enquiry into Diet and Nutrition amongst Indian school children in Kampala with special reference to the Consumption of Milk.—*East African Med. Jl.* 1937. Vol. 14. p. 199.

Trowell (H. C.). Pellagra in African Children.—*Archives of Disease in Childhood.* Aug. 1937. Vol. 12. No. 70.

Financial.—Expenditure on Medical Services during 1937 amounted to £176,500, a sum which represents 9·0 per cent. of the total revenue of the Protectorate during the same year. *P. Granville Edge.*

NYASALAND PROTECTORATE (1937).

Nyasaland Protectorate consists of a strip of land about 520 miles long by 50 to 100 miles broad lying to the west and south of Lake Nyasa. Its neighbours are Northern Rhodesia to the west, Tanganyika to the north and north-east and Portuguese East Africa to the south. Its total area is approximately 37,596 sq. miles of land and 10,353 sq. miles of water, and its chief towns are Blantyre, Limbe, and Zomba (the headquarters of the Government).

Vital Statistics.—In previous issues of this *Supplement* attention has been called to the commendable efforts made by Dr. A. D. J. Bedward Williams, Director of Medical Services, and Medical Officers, to secure dependable records relating to the population and state of the public health in Nyasaland. These efforts have continued unabated and the Report under review refers repeatedly to the first-rate importance of vital statistics as an instrument for the efficient administration of public health work. Dr. Bedward Williams observes that "Vital statistics are a measuring rod of the sanitary progress of a country, they have become an essential for every properly organized community," and again, "One of the most important problems to be solved is the collection of accurate vital statistics. It is absolutely necessary to have a yard-stick to measure the progress made in preventive and curative medicine. No programme of development can be efficiently prepared until data are obtained as to the morbidity of the people, as to birth and death rates, infant mortality, etc. The legal mechanism exists in the form of the *Statistics Ordinance*, 1935, this should now be applied."

But though registration of births and deaths is not yet compulsory in the Protectorate, small scale enquiries have continued to be carried out in limited areas as in previous years (see this *Bulletin*, 1936, Supp., p. 58* and 1937, Supp., p. 61* and pp. 63*–65*, and 1938, Supp., p. 72*) to secure dependable facts relating to a primitive people. For example, in the *Fort Manning District* records of births and deaths continued to be maintained throughout the year among an estimated population of 35,000; the birth and death rates were 49·4 and 22·8 per 1,000 persons respectively, and the infant mortality rate 61·9 per 1,000 live births. In the *North Nyasa District* vital statistical effort was confined to 24 villages having a population of 4,757 persons, and in this group birth and death rates were 42·4 and 28·5 per 1,000 respectively, and the infant mortality rate 272·2 per 1,000 live births. In the *West Nyasa District* three native authorities sought permission to introduce birth and death registration in their respective areas. This commendable pioneer effort received the warm support of the district Commissioner, and the necessary Order was introduced on July 1st 1937, and remained in force until the end of the year, whole-time clerks being employed travelling from village to village collecting the returns. The records for these areas for the last six months of 1937 include the following :—

Native Authority	M.	F.	Persons	Births	B.R.	Deaths	D.R.
Mbwana	4,481	5,118	9,599	229	47·7	67	14·0
Kabunduli	2,626	2,872	5,498	237	86·2	74	26·9
Atonga Tribal Council	15,707	18,259	33,966	482	28·4	291	17·1
West Nyasa District	22,814	26,249	49,063	948	38·6	432	17·6

With the exception of the isolated effort made in the West Nyasa District and referred to above *official recognition* so far as the vital statistics of Africans are concerned *has been given to the census enumeration only*. It is regrettable to note that financial considerations will not permit the continuance of this valuable experiment on the part of the Native Authorities in the West Nyasa District during 1938.

That other important medico-statistical enterprise which in recent years has been a special feature of public health work in Nyasaland, and which takes the form of *Medical Surveys*, will be discussed at a later stage in this Summary; meanwhile the available statistics for the Protectorate as a whole may be set out as follows :—

Race	Population	Births	Deaths
Europeans and Whites	1,894	29	18
Asiatics	1,631	83	19
Africans	1,635,804	Not known	Not known

European Officials resident numbered 279 with an average number resident of 225. Five were invalided and one died. *Native Officials* (and Native Troops and Police) numbered 2,752 and among these 12 deaths were recorded.

Maternity and Child Welfare Work.—It is observed that owing to lack of funds and staff little progress can be reported on the field of medical endeavour devoted to the interests of women and children in Nyasaland until provision has been made for the establishment of maternity and infant welfare centres, facilities for the adequate nursing of women and children, accommodation for native women undergoing training as nurses and midwives, and the appointment of health visitors, etc. And yet despite these serious handicaps there has been a satisfactory increase in all branches of maternity and child welfare work at the African Hospital, Zomba, which is the only Government centre so far established in the Protectorate; at this centre 85 new ante-natal cases were dealt with, 55 labour cases conducted, and attendances at the child welfare clinic totalled 1,262. At this Hospital two certified midwives are employed, and 14 native nurses are undergoing training. Maternity work performed at other Government African Hospitals is said to be " almost negligible " owing to the lack of European nurses or trained native female staff. Extracts from the Annual Report of the Jeanes Training Centre are of first rate interest and importance, and strikingly demonstrate some of the difficulties encountered when efforts in the interests of expectant mothers are attempted among a primitive people and how some of these difficulties may be overcome. For example, after pointing out that " the root of the trouble is in the deeply grounded fears and tribal taboos in the uneducated village woman " the Report goes on to say " We have found it wise to let the village women observe any African taboos to which they firmly believe so long as these do no harm " . . . " the mental distress caused to patient and relatives by needless infringement of the taboos only adds to the reluctance of village women to seek help or enter the hospital," etc. Native midwives are allowed to be present at deliveries of their patients in the hospital; this permission, it is said, " has done much to remove the antipathy of these professional African practitioners who might naturally be

expected to be suspicious of, and to resent anything which would lead to the loss of their means of livelihood, *i.e.*, midwifery fees," while it is hoped that as observers they may acquire knowledge of European midwifery methods.

Government continued to collaborate with and subsidize the *Missions* undertaking maternity and child welfare work. At the centre maintained by the Church of Scotland Mission at Blantyre, four women were trained as midwives during the year, and two new infant welfare centres were opened. Native midwives are also trained at the Mlanda Centre of the Dutch Reformed Church. Eight girls are in training at Bandawe and at the infant welfare centre 3,805 attendances were recorded.

The figures below summarize the volume of work carried out at centres other than the African Hospital, Zomba, subsidised by Government :—

	Mlanda Mission	Blantyre Mission	Jeanes Centre
(*a*) Infants registered at Welfare Centres	532	205	46
(*b*) Confinements conducted ...	118	437	73

School Hygiene.—All European schools were inspected during the year, and general health conditions of the pupils reported to be satisfactory. With regard to African schools, it was hoped that at least one such school in each district would be examined during the year, but the pressure of routine work prevented this programme from being carried out, and only a small percentage of the schools were visited and 731 children medically examined. The Report under review describes the results of inspections carried out at five African schools, *viz.* :—

The Central School, Karonga, where 251 boys and 38 girls were examined. Two early cases of leprosy were discovered.

Providence Girls' School, Mlanje.—A high incidence of helminthiasis among the 167 pupils examined.

Kasina Mission School, Dedza.—General improvement in physical condition, etc., among the 108 pupils examined, due to adequate dietary and attention paid to personal hygiene.

Mission School, Mponda's, Fort Johnston.—Latrine accommodation insufficient. Pupils examined 107 ; medical treatment given where necessary.

Catholic Institute, Blantyre.—No considerable improvement noted in the condition of the 60 pupils examined ; stricter attention to matters of diet, etc., recommended.

The results of *Medical Surveys* (see hereafter, *Public Health,* also this *Bulletin,* 1937, Supp., pp. 63*–64* and 1938, Supp., pp. 72*–73* ; 76*), are presented in detail in a series of Tables in the Report under review. Results are assembled from seven areas in the Protectorate in three age-groups, the first of which relates to children aged 0–10 years ; haemoglobin estimations, the results of blood film, spleen, urine and stool examinations are among the data tabulated.

Public Health, Sanitation, etc.—Under the heading of Public Health, Dr. Bedward Williams contributes an admirable account of the

historical development of the health services of Nyasaland, reviews the work performed by the Medical Department and progress made during the past 25 years, and submits recommendations for the future development of public health work in the Protectorate. This valuable section of the Report should be read in its entirety, for limits of space in this *Supplement* prohibit the adequate summary which the contribution merits.

With regard to the work of the Department generally, it is said that there is little that is new to record. In the larger townships the *disposal of night-soil and rubbish* has been satisfactorily dealt with, *water supplies* installed, drainage schemes carried out, and other sanitary improvements effected. But in the rural areas difficulties of a very special nature are encountered, while the lack of trained sanitary staff, European and African, tends to retard progress. Nevertheless, that the arduous and self-sacrificing efforts of Medical Officers have in many instances been successful in bringing about notable improvement in several areas, is evident from the extracts quoted from the reports of Medical Officers, as for example :—

Fort Johnston.—" A determined effort was made to commence the important task of rendering the natives really used to the idea of latrines as part of their ordinary life, and not a meaningless ritual forced upon them . . . .The idea was to have finally a latrine for every hut . . . . . No labour was provided . . . . No compulsion of any kind was used . . . . explanatory talks were given . . . . Nearly 200 latrines are in use and construction is still going on."

Dedza.—" The degree with which advice has been followed with regard to sanitary matters varies in direct proportion to the character and capability of the Native Authority concerned. Kachindamoto's area is the most satisfactory . . . . A mass hookworm campaign was carried out . . . . A propaganda meeting was attended by some 300 natives."

Dowa.—Of Sendeza it is said " Some sanitary work has been done . . . . The village headman is helpful, and the local school-teacher helps him . . . . New houses constructed and latrinization is complete. "

Kota-Kota.—" Vaccinators have done good work in rural sanitation."

Of the Protectorate as a whole it is noted that increased attention has been given to the protection of *water supplies* and that the boring of wells has been undertaken by the Geological Department.

The objects envisaged by the *Medical Surveys*, to which reference has been made above and in previous issues of this *Supplement*, are (*a*) to bring Medical Officers into closer contact with village life, and (*b*) to obtain by actual examination of the inhabitants of selected areas a knowledge of the population, births, deaths, and morbidity, etc., of such areas. These surveys have proved conspicuously successful, and during the year under review enquiries were carried out in seven areas ; in three areas it was found possible to undertake surveys (*a*) among villagers resident at lake level, and (*b*) among others living at an altitude of over 3,000 feet. The results of these investigations are set out in three age-groups in a series of Tables (see above, also *School Hygiene*), together with the commentaries on results by the Medical Officers conducting the surveys. The report of an additional survey conducted at the Jeanes Training Centre is dealt with separately as it relates to natives from many districts.

Inspections of *labour conditions* on estates were continued; these visits have been instrumental in bringing about general sanitary improvements. The emigration of adult males to the Rand mines continues (see this *Bulletin*, 1937, Supp., p. 65* and 1938, Supp., p. 75*) with serious results so far as native social life is concerned—there is a lack of fit adult males for carrying on the routine work characterizing the daily lives of the people, while returning emigrants bring with them the seeds of disease. While measures have been taken for the better care of repatriated labourers arriving in Nyasaland, no information is available of the thousands of returning emigrants who do not present themselves for examination.

Housing and Town Planning schemes, and *Food in relation to Health and Disease* are subjects of comment (see this *Bulletin*, 1938, Supp., p. 75*). Replies to the questionary on *nutrition* drafted by the Health Department and submitted to District Commissioners, to Missions and certain educated Africans, and to Medical, Agricultural, and Forestry Officers, were analysed and the results tabulated and embodied in a Memorandum presented to and adopted by the Native Welfare Committee. This Memorandum appears as an Appendix to the Report under review under the title of "*A Review of the Present Knowledge of Human Nutrition in Nyasaland.*"

The scheme for the *training of Africans* had to be modified considerably owing to sickness among the nursing staff (see this *Bulletin*, 1938, Supp., p. 76*). At the African Hospital, Zomba, provision is made for the training of various grades of African personnel, male and female, while at the Jeanes Centre the training of welfare community workers is undertaken.

Measures taken to spread the knowledge of Hygiene and Sanitation continued to be energetically implemented.

Recommendations and Proposals for Reorganization and Future Development of Health Services are discussed at considerable length (see also this *Bulletin*, 1938, Supp., p. 75*).

Port Health Work.—The quarantine camp at Port Herald on the Beira-Blantyre Railway continued to function; during the year 71 Africans were detained for vaccination, having been in contact with infectious disease, etc.

Hospitals, Dispensaries, etc.—At present there are six Hospitals each with 50 or more beds, and nine with 30 beds. It is recommended that three of the 50-bed hospitals should be increased to 100 beds, each with augmented staffs and equipment, and that the 30-bed units might have accommodation reduced to 15 beds and be placed in the charge of African hospital assistants. Financial considerations render the construction of a new hospital at Zomba impossible. In the Northern Province, the non-official European community provided the funds for the construction of a small cottage hospital at Lilongwe; Government will maintain and staff this unit. As regards *native hospitals* no new buildings have been erected nor have any additions been made to existing institutions. There is a growing demand from the Native Authorities for the provision of additional *rural dispensaries*. During the past two years upwards of 23 applications were received for new dispensaries; in some cases Native Authorities have provided the funds for the erection and maintenance of these units.

The volume of work dealt with at hospitals and dispensaries during 1937 may be summarized as follows :—

Race	Hospitals			Dispensaries Out-patients
	In-patients	Deaths	Out-patients	
Europeans	223	7	1,215	—
Africans and others ...	10,595	270	113,669	302,318

The commentaries upon general morbidity experience contained in the Annual Report under review are briefly referred to in the notes which follow.

Cases of *malaria* dealt with at hospitals and dispensaries totalled 15,774, the distribution by race and types of infection being as follows :—

Type of Infection	Europeans		Africans and Others		Rural Dispensaries Out-patients
	In-patients	Out-patients	In-patients	Out-patients	
Benign tertian ...	5	11	92	189	—
Quartan ...	—	1	32	113	—
Subtertian ...	2	41	527	717	—
Cachexia ...	—	1	46	50	—
Blackwater ...	—	2	—	—	—
Undefined ...	18	82	354	3,762	9,729
Totals ...	25	138	1,051	4,831	9,729

There were 22 deaths among Africans due to malaria, and 2 cases of *blackwater fever* with 1 death among Europeans. The Government Entomologist has pointed out that although *A. costalis* is almost absent during the dry season, it is overwhelmingly abundant during the late rains, while the other common species, *A. funestus*, shows no numerical increase during the year. He also found that the infection rate among *costalis* was very much higher than in *funestus*. The usual *anti-malarial measures* were successfully employed and it is reported that as a result the mosquito nuisance has been abated to a large extent in some areas.

At the Government Laboratory, Zomba, 1,379 out of 4,827 blood films examined were found to contain malaria parasites, the positive findings being *P. falciparum* 1,154, *P. malariae* 189, and *P. vivax* 36. The reports of the *Medical Surveys* (see above) present the results of blood film and spleen examinations at high and low altitudes in various areas.

Only 88 (non-fatal) African cases of *smallpox* were reported during the year ; 175,162 vaccinations were performed.

A somewhat serious epidemic of *cerebrospinal meningitis* occurred in the Southern Province and necessitated the promulgation of special rules under the Public Health Ordinance for the control of the movements of natives, etc. The first case occurred in August and spread was rapid ; altogether 780 cases were reported and of this total 603 occurred in the Mlanje District. Dr. W. T. C. Berry, the Medical Officer seconded for special duty in connexion with the epidemic, contributes a detailed report which is presented as an Appendix to the Report under review.

Of *relapsing fever* 139 cases were notified. Of the total cases recorded 51 were dealt with in the Kota-Kota district alone where most of the cases gave a history of having slept in Government rest-houses; the importance of having these rest-houses constructed of vermin-proof materials is emphasized. The Medical Officer Kota-Kota also reports among the results of his *Medical Surveys* in the area "the carrier of relapsing fever is to be found in every hut."

Only one (non-fatal) African case of *enteric fever* appears in the Hospital Returns, but 1,538 cases of *dysentery* were treated during the year, and of these 62 occurred among Europeans. The distribution of types of intection was (a) *Europeans*, amoebic 56, undefined 6, and (b) *Africans*, amoebic 150, bacillary 10, undefined 1,316. One European and 5 African deaths were ascribed to the disease. Among 1,396 faecal specimens examined at the Government Laboratory 88 were positive for *E. histolytica*.

Tuberculosis is considered to be increasing though it is not known even approximately what the incidence of the disease really is. Of the 251 cases reported during the year 145 patients were suffering from the *pulmonary* form of the disease. Out of a total of 252 Nyasaland native labourers repatriated from Southern Rhodesia during the year 39 were stated to have had tuberculosis and of these 35 were said to have suffered from phthisis. With a view to obtaining more accurate information concerning the incidence of the disease, surveys were carried out in three areas, and among 344 children examined by the dermal method, using Moro's tuberculin ointment, 31 gave positive reactions. It is said to be practically impossible to keep African patients in hospital for periods long enough to treat the disease effectively.

Of *trypanosomiasis* only two cases were reported—both from the Kota-Kota district. The medical Entomologist, Dr. W. A. Lamborn, reports that the steady retreat of the tsetse in a northerly direction continues; he estimates that the flies have vacated approximately 400 square miles of country since 1927. Dr. Lamborn discusses the probable causes which have brought about the continued diminution of the numbers of flies, and concludes that the decline must be due largely to the dearth of animal life on which the insects depend for their food; the opening up of large estates, shooting, organized hunts by natives, etc., have all played their part in scaring game animals which have withdrawn to the Reserve in the North. A survey for parasites of the tsetse was commenced with a view to determining to what extent they may be responsible for the steady decline in the numbers of "fly," but first results suggest that parasites do not play an important part in bringing about the observed reduction.

Helminthiasis.—The following data relating to patients treated for helminthic diseases have been extracted from Hospital and Dispensary Returns—*ankylostomiasis* 12,242 cases, *ascariasis* 2,231, *taeniasis* 161, *schistosomiasis* 7,487 and other helminthic diseases 342, giving a total number of 22,463 cases dealt with. [These figures refer to *Out-patients* only. It would appear that either in-patient cases were first seen as out-patients and not regarded as new cases if afterwards admitted to hospital, or in-patient cases have been omitted in error from the total in the Report under review. The text of the Report specifically states "The total number of cases treated was 22,463." But in addition to the 22,463 out-patients there were 1,845 non-European in-patients and one European in-patient.] The results of stool and

urine examinations carried out in the course of *Medical Surveys* in various areas are presented in a series of tabular statements together with the commentaries of Medical Officers in charge of these investigations. The Medical Officer in charge of the survey of the North Nyasa District, commenting on the high incidence of *schistosomiasis* in the area surveyed observes :—

" In this marsh *B. africanus* is prevalent, *Limnaea* were also found but in a search extending along the Lake shore from the River Songwe to Deep Bay (approximately 50 miles) I did not see a single *Planorbis*. It would appear that this mollusc is not the carrier of the disease in this district, and another snail must be concerned."

In an Appendix to the Report under review Dr. W. L. Gopsill contributes an interesting account of the incidence in this area under the title of *" Some Observations on Schistosomiasis in North Nyasa District."*

At the Government Laboratory among 1,078 specimens of urine examined 219 contained evidence of bilharzial infestation, while the findings among 1,396 faecal specimens dealt with included *ancylostoma* 520, *ascaris* 27, *S. mansoni* 37, *E. histolytica* 88.

Of *venereal diseases* 3,324 cases were reported and of these 2,377 cases were of *syphilis* and 947 *gonorrhoea*. The out-patient clinic at Blantyre continued to function with fair success, but subsequent attendances following first visits for treatment were disappointingly few ; it is noted that a native nurse was posted to the clinic and 145 female patients paid a first visit. At Denza among 1,435 labourers examined only 28 were rejected on grounds of venereal disease ; the finding is interesting in view of the common belief that venereal diseases are increasing. Hospital and Dispensary Returns also show that 2,960 cases of *yaws* were treated during the year under review.

Leprosy.—The treatment of the disease in Nyasaland is carried out almost entirely by the Missions with the financial aid of Government. There are 12 clinics established throughout the country, the majority of the centres being in charge of qualified nurses. " Approximately " 646 lepers were under treatment at these clinics during the year, 260 were admitted, 96 were discharged, and 35 died. It is not known to what extent the disease is prevalent in Nyasaland, but it may be possible to obtain fairly dependable information during the course of the next census.

Among *other diseases* mentioned in the Report *deficiency diseases* were the subject of special investigation by the Medical Department, the results of the enquiry being embodied in a Memorandum presented to the Native Welfare Committee (see above, *Public Health*). Five cases of *rickets*, 3 of *scurvy*, 5 of *beriberi* and 48 of *pellagra* were recorded during the year. *Rabies* is said to have caused anxiety and to have " shown no signs of abatement," but no cases appear to have been recorded unless they have been included under the title " *Injuries inflicted by animals* (bites, kicks, etc.)" Over 50,000 cases of *ulcers* among African patients and 43,781 cases of *bronchitis* were dealt with.

Scientific.—The Report of the Government Pathologist is confined to a summary of the specimens received and examined at the Government Laboratory, and findings recorded. Altogether 8,058 specimens were dealt with ; the principal findings have been referred to in preceding sections of this summary. The Annual Report of the Medical Entomologist has also been quoted in the section *trypanosomiasis* above. In addition to the tsetse fly surveys, Dr. Lamborn continued

his survey for rodents and their ectoparasites, and his investigations of the breeding habits of *Tabanidae*, and commenced a study designed to determine whether *Myco. tuberculosis* undergoes any morphological changes within the fly *Musca sorbens*, and whether the organisms remain viable after they have been ingested by the fly.

Four Special Reports appear as Appendices to the Report under review, *viz.* :—

(1) Post-Operative Complications in the Natives of Nyasaland, by Dr. C. H. Howat.

(2) Cerebrospinal Fever in Nyasaland, by Dr. W. T. C. Berry. (Reviewed in *Bulletin of Hygiene*, 1938, Vol. 13, p. 867.)

(3) Some Observations on Schistosomiasis in the North Nyasa District, by Dr. W. L. Gopsill. (Reviewed above, p. 38.)

(4) The Native Welfare Committee Report on Nutrition. (Reviewed in *Bulletin of Hygiene*, 1938, Vol. 13, p. 981.)

Three of these Special Reports have already been the subject of brief reference in the preceding notes. It remains to say that Dr. Howat's contribution discusses four common complications of operation, *viz.*,. post-anaesthetic vomiting, infection of the surgical wound, retention of urine, and pulmonary lesions—bronchitis, pneumonia, etc. His surgical practice in Nyasaland leads him to conclude that these complications are encountered rarely or not at all in the Protectorate.

Financial.—Actual expenditure on Medical Department services during 1937 amounted to £51,322 as against an *approved* expenditure of £52,712. *P. Granville Edge.*

ZANZIBAR PROTECTORATE (1937).

Zanzibar Protectorate off the East African Coast comprises the islands of Zanzibar and Pemba and the islets within their territorial waters. Zanzibar is about 53 miles long by 24 miles broad with an area of 640 sq. miles. Pemba, to the north-east of Zanzibar, is about 42 miles long by 14 miles broad. The only town of importance is Zanzibar Town.

Vital Statistics.—Published figures are compiled from returns submitted by the *Mudirs* through the Provincial Administration, and in the words of the Report " cannot be regarded as even approximately correct," for registration is incomplete. The principal facts are given as follows :—

Estimated Population	Registered Births	Birth Rate	Registered Deaths	Death Rate
243,135	4,139	17·0	4,026	16·9

The *infant mortality rate* for the year is not stated, but it is observed that rates in specially defined areas in 1937 were 141 for natives and 159 for Indians per 1,000 live births. The *maternal mortality rate*

of 9·2 per 1,000 live births relates principally to the town of Zanzibar; for the Protectorate as a whole it is believed this rate would be greatly exceeded. The investigations of the Welfare Clinic are being continued and it is hoped that by the end of 1938 sufficient data will have been assembled to provide reasonably dependable infant and maternal mortality rates.

European Officials resident numbered 110, with an average number resident of 70. One death was recorded. *Non-European Officials* resident numbered 462, with an average number resident of 423. Five were invalided but no deaths were recorded in this group.

The most common causes of sickness amongst Europeans and Non-European officials were *influenza*, *malaria*, and *diseases of the respiratory and digestive systems*.

Maternity and Child Welfare Work.—The year 1937 saw the results of the first full year's work of the Lady Medical Officer and her staff (see this *Bulletin*, 1938, Supp., p. 81*). During the year the 7,310 new patients registered at the special day clinics made 45,306 attendances for treatment; of special significance is the fact that the proportion of women in Zanzibar attending hospitals for treatment rose from 22 per cent. in 1935 to 40 per cent. in 1936 (when the clinic started) and to 59 per cent. in 1937. In the Pemba Hospitals where there is no woman doctor the proportion of women patients has remained roughly constant at 23 per cent. The striking success of the venture in Zanzibar will be followed by the appointment of a second woman doctor in 1938 with extension of similar activities to the island of Pemba and to rural areas in the Protectorate when financial resources permit. Meanwhile at the hospitals at Chake Chake and Wete in Pemba a start has been made by providing women's out-patient departments separated as widely as conditions permit from the men. In commenting upon these new departures and of the success of the initial venture in Zanzibar, Dr. W. Leslie Webb, Director of Medical Services, quotes from the memoirs of one of the daughters of the first Sultan of Muscat and Zanzibar, and published in 1880, in which the enlightened lady observed that if a "female physician" could be brought to undertake service in Zanzibar she would be able to do more good "than ten medical men combined."

At the three *Infant Welfare Clinics* held weekly, attendances totalled 3,612, and at the *Ante-Natal Clinic* 847. During the year under review cases of *diseases of the puerperal state* dealt with in Government Hospitals numbered 302 as compared with 115 in the preceding year. Clinics were also actively functioning during the year at four rural dispensaries with encouraging results.

The *Zanzibar Maternity Association* is no longer under the control of the Medical Department (see this *Bulletin*, 1937, Supp., p. 70*, and 1938, Supp., p. 81*), and returns of the work of that organization will no longer be included in the Annual Medical Report.

School Hygiene.—A most satisfactory feature of the year's work was the extension of the School Medical Service. During 1937 over 1,600 children were medically examined and nearly 1,300 were seen by the Dental Surgeon—the largest numbers of school-children ever dealt with in a single year in the Protectorate. The service is well established in both islands and fewer difficulties are met with, for examinations are willingly accepted by both parents and children. The results of these examinations are set out in considerable detail in the Report under review but for present purposes it must suffice to summarize

briefly the principal findings. In both Zanzibar and Pemba *malnutrition* is grossly evident amongst rural African children, less so among rural Arabs; the town-dwelling African child is better nourished than his rural contemporary, but is less well fed than the town Arab child. Malnutrition is less evident amongst pupils at the Government girls' school than amongst male children. With one or two exceptions the cleanliness of school-children leaves much to be desired—*scabies* is common in the rural schools owing to the filthy condition of the cotton garments worn by pupils. In all schools *dental caries* is very common—about 92 per cent. of the pupils showing defects. Pathological eye conditions were frequently met with, being most common in areas where malnutrition is evident. *Ankylostomiasis* is said to be universal in the rural areas, with *ascariasis* common in the southern area in schools on the east side of the island of Zanzibar. Treatment for diseases met with amongst school-children is regularly carried out: treatment for *yaws* and *syphilis* has produced satisfactory results, but for ankylostomiasis results have not proved so encouraging owing to the frequency with which re-infestations occur. Lectures on health subjects are given to school-children, special attention being devoted to talks on the dangers of hookworm, malaria, scabies, etc., and how these diseases may be avoided.

Public Health, Sanitation, etc.—Dr. W. Leslie Webb observes, "Adequately trained native staff still remains one of the crying needs of the department, and it is difficult to see how any material extension of service can be effected without considerable cost until it is provided." In 1935 Government approved a scheme for the formation of a Zanzibar Native Medical Service "through the framework of which rural Africans could be given a comprehensive training in medical work with a view to subsequent absorption into the Department as rural dispensers, nurses, and midwives." However, at that time there were no rural Africans of the required educational standard available for training, though subsequently with the co-operation of the Education Department, arrangements were made for the further general education of a number of boys and girls; the first of these classes of boys will be available for Medical Department training in 1940 and of girls in 1942.

The anti-malarial survey conducted by Dr. D. D. McCarthy (see this *Bulletin*, 1938, Supp., p. 84*) under a grant from the Colonial Development Fund was completed in September 1937 and it is expected that his Report will be published early in 1938. Preventive measures continue to be actively carried out along the lines described in previous issues of this *Supplement*.

Present-day methods of *sewage disposal* were described in earlier Reports and referred to in this *Bulletin*, 1937, Supp., p. 72* and 1938, Supp., p. 82*. The posting of three locally-trained African Sanitary Inspectors for permanent employment to rural areas in connexion with a scheme for providing *bore-hole latrines* for the whole population in those areas, marks the first serious attempt to cope with the problem of rural sanitation. Scavenging services and methods for the removal and *disposal of refuse* continued along lines previously described.

In Zanzibar *water supplies* were ample and satisfactory where water-mains are laid, but in the native town the population have to employ water carriers to bring water to their houses. In Pemba supplies to Chake and Wete were reasonably satisfactory, but in Mkoani water is of poor quality and insufficient in quantity. The

Public Works Department have carried out experimental borings and it is expected that the present unsatisfactory conditions will shortly be remedied. In rural areas water is still obtained from deep and shallow wells and from rivers; Sanitary Inspectors are required to supervise and endeavour to improve supplies in such areas.

Under the heading of *Housing and Town Planning* a somewhat detailed account is provided of general conditions and of attempts to bring about improvement so far as urban housing is concerned in Zanzibar and Pemba. Numerous surveys and inspections of properties brought to light many cases of unsatisfactory housing, and steady pressure was maintained to persuade or enforce owners to effect necessary improvements. Rural housing conditions did not alter during 1937; it is said that though on the whole rural housing is not good, there is little overcrowding.

As regards *foods, etc.*, it is stated that the publication of a "*Nutritional Review of the Natives of Zanzibar*" early in the year served to focus attention on the subject, for it was clearly demonstrated that native dietaries are invariably lacking in some essential foodstuffs to the detriment of the health of the people. The implementation of the recommendations made for the improvement of existing conditions must be a matter of time and governed largely by financial considerations (see also this *Bulletin*, 1937, Supp., p. 72* and 1938, Supp., p. 83*).

Training of Native Personnel.—A notable advance in the training of non-European personnel was made when the systematic training of nine learner Sanitary Inspectors (Indian, African, and Goan) culminated in their examination under the auspices of the Royal Sanitary Institute: five satisfied the examiners. The training scheme is the first of its kind to be undertaken in East Africa. The training of *rural dispensers* was continued as usual.

Measures taken to spread the knowledge of hygiene and sanitation included lectures by Sanitary Inspectors to school-children and the general population, the distribution of pamphlets devoted to explaining the meaning of simple health precautions, lectures by Medical Officers, Health Exhibitions, etc.

The Annual Report of the Dental Surgeon is printed as an Appendix to the Annual Medical Report under review. It is stated that "after four years of observation of the natives of Zanzibar Protectorate, it is safe to affirm that over 90 per cent. of them suffer from dental disease." The Report comments at some length on oral conditions in the Protectorate, discusses dental work carried out among school-children, and supplies tabulated facts relating to the numbers of schools visited, pupils examined, etc.

Port Health Work.—During the year 589 ships and 712 dhows entered the harbour and 1,531 immigrants landed. Routine services were carried out as usual, and nothing unusual in respect of Port Health work is reported.

Aeroplane traffic accounted for the arrival and departure of 347 planes carrying 384 immigrants and 267 emigrants. All aircraft arrive from Kenya or Tanganyika; no quarantine restrictions of any kind are imposed and so far do not appear to be called for.

Hospitals, Dispensaries, etc.—The numbers and distribution of Hospitals and Dispensaries in the Protectorate may be conveniently set out in the following manner:—

Locality	Hospitals	Special Clinics	Dispensaries	Totals
Zanzibar Island :—Town ...	6	2	2	10
District ...	2	—	19	21
Pemba Island :—Town ...	3	—	—	3
District ...	1	—	7	8
Totals	12	2	28	42

The above figures include one European hospital and a Mental Hospital in Zanzibar Town, a Poor Home, and a Leper Colony in Zanzibar District, and a Leper Colony in Pemba Island District.

At these institutions 4,673 in-patients were admitted during the year, in-patient cases treated totalled 5,197 and 476 hospital deaths were recorded. Out-patients dealt with numbered 121,347 and among them 448,370 attendances were recorded, 219,396 being attendances at Dispensaries. Mention has already been made of the extension of medical facilities in the interests of women (see *Maternity* above) and of the proportions of female to male patients attending for treatment.

The only figures of value throwing any light on the incidence of disease in the Protectorate are the returns compiled at Government Hospitals and Dispensaries ; the following notes briefly summarize the principal references contained in the Report under review to disease incidence during 1937.

Malaria patients treated at Government Hospitals, etc., numbered 8,801 and of these 249 were in-patients (7 died) and 8,552 were out-patients. The distribution of types of infection among in-patients reads *benign tertian* 28, *quartan* 1, *subtertian* 123, and unclassified 97, the corresponding figures for out-patients being 457, 22, 1,797 and 6,276 respectively. There were also 5 cases of *blackwater fever*, two of these being treated as in-patients. At the Pathological Laboratories, Zanzibar and Pemba, the following blood films were examined and findings recorded :—

Laboratory	Blood Films	Positive Findings			
		P. vivax	*P. falciparum*	*P. malariae*	Undefined
Zanzibar ...	9,378	253	1,252	26	563
Pemba	2,015	446	389	—	108

P. vivax and *P. falciparum* were found together in 22.

Reference has been made in the section *Public Health* above of antimalarial control measures, and of the special survey completed in 1937.

No case of any of the dangerous infectious diseases was recorded (see this *Bulletin* 1938, Supp., p. 84*). During the year 8,805 anti-smallpox vaccinations were performed in Zanzibar and 1,918 in Pemba. One case of *relapsing fever* was reported but as *O. moubata* is not known to exist in Zanzibar or Pemba it is certain the disease must have been contracted outside the Protectorate. One fatal case of *cerebrospinal meningitis* was notified from Wete in Pemba.

Of the 22 cases of *enteric fever* notified, 20 occurred in Zanzibar Town. At the Zanzibar Laboratory 18 out of the 113 samples of serum agglutinated *Bact. typhosum*. *Dysentery* was responsible for 56 cases, and of these 36 occurred in Zanzibar. (Hospital Returns record 61 cases of which 6 were amoebic, 24 bacillary and 31 unclassified.) Among 142 faecal specimens examined *Bact. dysenteriae* Flexner was isolated in 26 and Sonne in 6.

During the year 214 patients were treated for *tuberculosis* (all forms) and of this total 182 were suffering from the *pulmonary* type of the disease ; 45 of the 48 deaths were due to phthisis. New cases notified, nearly all of the pulmonary type, numbered 151 and of these 125 were in Zanzibar Island. The year's figures for the Walezo Tuberculosis Asylum were, total treated 94, died 33, discharged 39. There were also 6,454 cases of *bronchitis* and 204 of *pneumonia*.

New cases of *leprosy* notified numbered 28 and the total cases treated 137. The two Leper Colonies at Walezo in Zanzibar and Makondeni in Pemba are well patronized by lepers who enter and reside there voluntarily (see this *Bulletin*, 1938, Supp., p. 84*).

Helminthic diseases.—Hospital Returns show that 12,202 cases of *ankylostomiasis* were dealt with during the year ; the view is expressed that " there can be no doubt that nearly the whole population of the island of Zanzibar is infected with hookworm." In an attempt to discover to what extent the application of proved methods of control is applicable in Zanzibar, Government is to provide sufficient latrine accommodation in a selected area, and by the end of the year six boring machines were at work in the area under the charge of three African Sanitary Inspectors. Efforts are being made to popularize the use of latrines by constructing bore-hole latrines and providing cement tops free of charge, at a cost to Government of 4 shillings each complete latrine, and if the experiment proves successful it is hoped to apply the principle to the whole Protectorate. *Schistosomiasis* is said to be " widespread " in Pemba but less evident in Zanzibar : intestinal forms of the disease are rare. During the year 576 cases were treated. An investigation of the problem was undertaken by a research worker from the London School of Hygiene and Tropical Medicine and by the end of the year the snail carrier had been incriminated, and the fact ascertained that its distribution in the Protectorate is limited by certain definite factors. In the light of these discoveries it is hoped that measures may be devised for the complete eradication of the disease. At the two Laboratories the following findings were recorded following the examination of specimens of faeces and urine :—

Item	Laboratory	
	Zanzibar	Pemba
Faecal specimens examined	6,328	868
Positive findings :—		
Ancylostoma	2,508	408
Ascaris	485	29
Trichuris	942	46
S. mansoni	5	—
Urines examined	499	813
Positive findings :—		
S. haematobium	162	129

Venereal Diseases.—During the year 1,062 cases of *syphilis*, 1,465 of *gonorrhoea*, 65 of *soft chancre*, and 4,188 of *yaws* were treated. It is stated that the figures for gonorrhoea " give no idea of the incidence, for almost every adult has the disease " (see this *Bulletin*, 1938, Supp., p. 85*). At the Zanzibar Laboratory the Kahn test applied to 4,210 samples of serum gave 684 positive and 592 doubtful reactions.

Other diseases referred to in the Report included the following. It is said that *filariasis* " occupies a prominent position amongst diseases affecting natives." For *ulcers*, 21,973 cases were dealt with. Among the 3,354 *diseases of the eye* treated were 93 cases of *trachoma*. Cases of *influenza* numbered 1,098 ; all were of a mild type and no deaths were reported.

Scientific.—The Laboratories at Zanzibar and Pemba continued to function as heretofore and references to the work and findings recorded have been made under various headings in the preceding notes. During the year the following paper was published :—

Vassallo (S. M.). Duodenal Ulcer in Zanzibar.—*East African Med. Jl.* 1937. Vol. 14. No. 3.

Financial.—Total expenditure on Medical Department Services amounted to £48,204, a sum which represents 9·7 per cent. of the total revenue of the Protectorate.

P. Granville Edge.

REVIEWS AND NOTICES.

ROCKEFELLER FOUNDATION. INTERNATIONAL HEALTH DIVISION. **Annual Report 1937.**—243 pp. With 15 figs. (1 map) on 8 plates. New York: 49 West 49th Street.

To do anything like justice to the work which has been accomplished during 1937 by the aid of the International Health Division of the Rockefeller Foundation pages would be needed. Mere enumeration of the various projects would take up more space than is available and it is, therefore, necessary to select from the investigations referred to in this report those likely most to interest readers of this *Bulletin*.

The report contains digests of all papers published by members of the staff on projects carried out under the auspices of the Health Division. These may all be placed under one of three categories: investigation and control of specific diseases, aid to State and local health services, and aid to public health education. The first of these will make the greatest appeal to readers of this *Bulletin*. The others are of the utmost importance but will not be detailed here. States and countries assisted include the United States, Canada, Mexico, Costa Rica, Salvador, Panama, Porto Rico and Cuba; six European Governments, *viz.*, Albania, Austria [when it *was* Austria], Hungary, Italy, Rumania and Turkey; also Egypt and the East Indies. Various Institutes and Schools of Hygiene have been assisted and Public Health nurses educated, and fellowships and travel and training grants bestowed [see map].

As regards specific diseases on which research and control work have been carried out the chief were yellow fever, malaria, tuberculosis, influenza, yaws, and ankylostomiasis.

Investigation and trial have shown that there is now available a practicable safe method of large-scale immunization against *yellow fever*; reactions are but mild and about 95 per cent. of those vaccinated acquire immunity. Women in pregnancy, even in the later stages, were vaccinated without untoward results. A study of the greatest importance for early solution is the epidemiology of jungle yellow fever, the means by which it is maintained. This is being pursued in Brazil and Colombia. Virus research has resulted in procuring an almost avirulent strain, known as 17 D, grown on chicken embryo tissue from which brain and cord have been removed; by this means the virus has lost much of its viscerotropic and neurotropic properties without reduction of its antigenic potency. Study of the transfer of immunity hereditarily has shown that the initial immunity present at birth is entirely passive and is rapidly lost. The search to determine the vector or vectors of jungle yellow fever virus still goes on.

In *tuberculosis* field studies have been pursued in New York City, in Tennessee, Alabama, and Jamaica and, in Europe, in Austria. This disease is one of the foremost problems in Jamaica, and in that island endeavour has been made to determine its character and incidence, its ways of spread under local conditions and to decide upon measures of control. In Kingston, 75 per cent. of those who had reached the age of 15 years reacted positively to tuberculin. The type in Jamaica is rapidly fatal, resembling that of infancy and early childhood in Europe and North America. Pulmonary tuberculosis of manifest character was most frequent in the black population, latent apical

Types of health work in Europe and Africa to which aid was given by the International Health Division of the Rockefeller Foundation in 1937.

[Reproduced from the *International Health Division Annual Report, 1937.*]

disease more in the pale brown population; these differences may not be so greatly hereditary or racial as environmental. In Jamaica again *yaws* is another serious problem. In spite of systematic efforts at control by treatment carried out extensively by district medical officers for more than a decade, the number of cases reported continued to increase and in 1932 the Foundation agreed to co-operate with the local Government. The entire island was surveyed, a central yaws laboratory was established, a research unit and two treatment units instituted. The result of the survey was to demonstrate that the disease was limited to some half-a-dozen defined areas in districts with a heavy rainfall. Differences from syphilis were shown to be due, not to variations of environment (*e.g.*, tropical and temperate zones) but to " inherent biological differences between the causative agents." By means of detecting cases and treating them, and watching for any fresh infections yaws had been reduced by four-fifths.

Studies carried out in Egypt on *ankylostomiasis* have indicated that over 40 per cent. of the rural inhabitants are infected. Comparing villages in which sanitation had been installed with those where only treatment was given revealed the melancholy fact that the " sanitation produced no measurable effect on infection " with hookworm, ascaris, and two species of schistosomes, and there seemed to be within three years complete dissipation of the effects of such treatment as the people could be prevailed upon to take. Though sanitation did not maintain, or even cause, a reduction in the parasite infestation rate, it had, of course, other beneficial results.

Resurvey of areas where campaigns against ankylostomiasis had been carried out a quarter of a century or more ago—South Carolina, Mississippi, Kentucky and Tennessee—showed that there had been reductions ranging from 33·7 to 77·3 per cent.

In *malaria* control demonstrations, investigations and surveys have been undertaken in Florida, Mexico, Cuba, Porto Rico, Panama, Colombia and elsewhere, in addition to various European countries and Palestine and India. From the aspect of pure research mention may be made of the study of Colonel S. P. James on *Plasmodium gallinaceum* at the Molteno Institute, Cambridge, and of the uses of *P. knowlesi* in therapeusis of general paralysis, one disadvantage of which appears to be the possibility of sudden development of a heavy infection, not at once clinically obvious.

Many other subjects of research and public health importance are related in the report. Some, in fact many, of the published papers have already been abstracted in the *Tropical Diseases Bulletin* at the time of their publication, but it is very useful to have them as it were gathered together in this annual report. *H. H. S.*

Chambers (H. D.) [M.B., Ch.B. (Aberd.), Medical Officer, Jamaica, B.W.I., Late House Physician, Aberdeen Royal Infirmary.] **Yaws (Framboesia Tropica).** Foreword by Sir David Wilkie, O.B.E., M.D., F.R.C.S., F.A.C.S.—pp. xiv+169. With 15 figs. (2 maps). 1938. London: J. & A. Churchill Ltd., 104 Gloucester Place, Portman Square, W.1. [5*s.*]

Yaws might well be called the Cinderella of tropical diseases, for only in recent years has serious attention been given to this widespread and disabling condition. Early in 1932, the Jamaica Yaws Commission initiated an intensive study of the disease. The

admirable reports of the Commission, from 1932 to 1936, placed a wealth of information at the disposal of students of the subject. Dr. Chambers joined the Commission, as Medical Officer in charge of a Field Unit, in March 1934, and thus had the good fortune to gain an intimate knowledge of the methods of research employed and the findings reached by the Commission. The Commission dissolved early in 1937 and Dr. Chambers has carried out some of the work then planned. He writes, therefore, with first-hand knowledge of his subject. The views expressed in his book are, clearly, based in the main on the work of the Commission and it is a little surprising that the work of the Commission does not receive more mention.

The book is divided into three parts: I deals with the history, geographical distribution, aetiology, epidemiology and pathogenesis; II with the symptoms, course and diagnosis; and III with treatment. A bibliography and index complete the work.

In Part I an interesting historical survey of both yaws and syphilis is given, mainly to support the view of non-identity of the two diseases. In the geographical section, the association of high atmospheric humidity with prevalence of yaws is pointed out. Under aetiology, much space is devoted to a description of the manifestations of the disease in its infective stages but the account of the spirochaete is somewhat scanty. In the chapter on epidemiology, yaws is placed second only to malnutrition as a cause of morbidity in Jamaica. But the author has resisted the temptation to assign any but a very subordinate position to malnutrition in the aetiology of yaws—a refreshing attitude in these days when it is indicted as a major factor in almost every ill to which flesh is heir in the tropics and elsewhere. The predominant parts played by actual contact and trauma are discussed at length: Dr. Chambers makes out a good case for the important rôle which he assigns to them but the possibility of an insect vector is dismissed too summarily. The work of Gordon Thomson and Lamborn on this question is not mentioned, The feet of the unshod native are, naturally, the most common site of the trauma; then come the legs and knees. Dr. Chambers thinks that the wearing of shoes and stockings by the children would notably reduce the incidence of yaws in Jamaica. His description of their sleeping accommodation suggests that night as well as day wear would be necessary. He finds that infection occurs most commonly in the age group 5–9. The importance of humidity again comes under review and two plans of Jamaica are given to demonstrate its influence. Humidity acts, Dr. Chambers considers, by keeping infective lesions moist. The causation of late lesions is discussed in the chapter on pathogenesis and a belief in their allergic nature is expressed.

Part II is, the author states, "intended mainly for Sanitary Inspectors and Nurses." The primary lesion is well shown in Fig. 3, but a fuller description of its appearance might have been included. The manifestations of the secondary stage are well described; one notes that the author does not find itching to be a feature. Under the tertiary stage are included, correctly in the reviewer's opinion, Juxta-articular nodules and Goundou. A comparison, in parallel columns, of the manifestations of yaws and syphilis is given and should prove very helpful, but the critical review of this question by Blacklock [this *Bulletin*, 1933, Vol. 30, pp. 739–751] should impose caution in accepting some of the distinctions as absolute. Differential diagnosis is very fully discussed in the next eighteen pages.

Part III, on treatment, occupies 19 pages. The relative advantages of arsenicals and bismuth are debated; a combined treatment is advised for infective cases. Details of technique are not included.

Most of the works listed in the bibliography were published more than a quarter of a century ago. Some omissions have already been indicated. The reports of the Jamaica Yaws Commission for 1932 and 1933 and the critical review of Yaws and Syphilis by Stannus [this *Bulletin*, 1926, Vol. 23, pp. 1–15, 81–92] are not included. An adequate index completes the volume.

In his preface, Dr. Chambers expresses the hope that his book will "prove interesting and be of help to members of parochial boards, ministers of religion, teachers, sanitary inspectors, nurses, parents and all other influential persons in yaws endemic areas . . . ." So much of the text relates to conditions in Jamaica that the book will appeal chiefly to residents on the island. They will find it both helpful in recognizing yaws and interesting, particularly the historical section. To the doctor practising in the tropics, it has little to offer; indeed, it does not seem to be intended for him.

Dr. Chambers' style is not an easy one. Digression leads to many repetitions. The use of parentheses is so frequent as to become irritating; a short glossary of technical terms would obviate its abuse. Thus "Wassermann reaction" is repeatedly followed by "(blood test)." Readers are likely to be confused by the spirochaetes being referred to as "pertenue," "germs," "spirochaetes" and "treponemata" in the course of a few paragraphs (pp. 82–83). On p. 21, readers are informed that CASTELLANI named the causal organism "*Treponema pertenue*," but, on p. 37, the author states that its discoverer "gave the name *Spirochaeta pallidula* to the new organism, but later substituted the more scientific name of '*Spirochaeta pertenue*'" [which, being a false concord is, of course, inadmissible]. Some of the figures are on too small a scale to show the lesions clearly; they will not bear comparison with those in the 1932 report of the Commission. The book suffers from being very uneven. Thus, while highly technical points, such as the possibility of tertiary lesions being allergic, are debated at length, elsewhere it is considered necessary to explain that varicose veins are "enlarged tortuous veins." There is, however, evidence that thought and careful observation have gone to the making of the book and it contains much that will be useful to the unqualified worker in this field in Jamaica. *J. B. Davey.*

SWELLENGREBEL (N. H.) & DE BUCK (A.). **Malaria in the Netherlands.** —pp. viii + 267. With 23 figs. & 2 plates. 1938. Amsterdam: Scheltema & Holkema Ltd. [Dfl. 5.] [British agents for sale: Baillière, Tindall & Cox. (10*s.* 6*d.*)]

The authors of this book have a very interesting story to unfold, a story, moreover, which is extremely well told. In the preface it is stated that malaria in the Netherlands "provides the investigator with what might be called a pocket edition on the epidemiology of this disease. Conditions in the Netherlands are little complicated because of the existence of only one parasite and one insect vector. Hence, well known and much discussed general epidemiological problems present themselves here in a shape so simplified as almost to partake of the nature of an experiment." The pages which follow are in fact a valuable contribution to the literature of the epidemiology of

malaria. Though *Pl. vivax* be the only species of malaria parasite, and the "shortwing" variety of *A. maculipennis* the only vector, malaria in the Netherlands, the last remaining stronghold of the disease in north-west Europe, presented problems by no means easy of solution. Students of malaria literature are well acquainted with the painstaking investigations of the authors whereby the most knotty of these problems were unravelled. In the volume under review the results of these and other investigations are gathered together in a connected story that retains the interest of the reader from beginning to end. The exposition is singularly clear.

In the short chapter dealing with the prevalence of the disease during last century attention is rightly called to the difficulties of determining the nature of epidemics of the past from contemporary descriptions. There is, however, abundant evidence of the permanent decline that malaria incidence underwent during the last quarter of the last century.

The behaviour of the short winged *A. maculipennis*, its partiality for breeding in brackish water and its habit of continuing to feed, and conveying malaria, after the cessation of its reproductive activities, and the importance of healthy carriers as a source of anopheline infection, are the factors of chief importance in determining the persistence of malaria in the Netherlands. These are also the chief obstacles to the eradication of the disease. The vagaries of malaria in the Netherlands are all explained in so satisfying a manner that one feels that finality has almost been reached. A book of unusual merit.

Norman White.

GABALDÓN (Arnoldo). **Primer informe anual (1937) de la Division de Malariologia.** [First Annual Report (1937) of the Division of Malariology, Venezuela.]—*Publicaciones de la Division de Malariologia, Venezuela.* 1938. April 19. No. 1. pp. vii+197. With 31 figs. & 9 graphs.

The Malariology Division of the Venezuelan Ministry of Health began to function in August 1936, and this, the first annual report, is a well documented record of the large amount of preliminary investigation that has been undertaken. Incidentally the report throws a good deal of light on health conditions generally in Venezuela, sufficient to indicate that the Malariology Division has an important mission to fulfil.

Venezuela is a large country with great diversity of physical and climatic conditions and consequently a great diversity of malaria conditions. It is very sparsely populated and in rural areas medical assistance is inadequate. Hitherto the chief source of information regarding the incidence of malaria in different parts of the country has been furnished by mortality statistics, with which this report is freely documented. These are, perhaps inevitably, of limited value. In some of the States the number of deaths ascribed to known causes is considerably less than half the total mortality. The total mortality varies in the different States from 22 to 25 per thousand. For the country as a whole the average annual number of deaths for the years 1930–1937 inclusive was 57,053. The causes of 26,186 of these deaths are unknown. Of the deaths from known causes 14·1 per cent. were ascribed to malaria. This percentage varied in 1937 in the

different States from 35·5 in Cojedes to 0·6 in the Federal District. The former figure would appear to be of doubtful accuracy for in the account of observations made in San Carlos, a small town in Cojedes, we read that the diagnosis "malaria" had been inserted on a large number of death certificates of cases of which the cause of death was completely unknown. For Venezuela as a whole the marked reduction which characterized malaria mortality recorded in 1936 and 1937 is explained by the fact that in those years malaria deaths certified by a doctor were alone taken into consideration.

The report gives details of observations made in places in 15 of the 22 States. A few of the surveys were fairly complete and the report describes the measures that have been adopted to control the disease. As examples of the diversity of malaria conditions may be cited observations made in Barcelona and Maracay. Barcelona, the capital of Anzoategui (pop. 11,497), on the river Neveri, 3 kilometres from the sea, suffers severely in certain years. The months of maximum prevalence are from October to April, which coincide with the seasonal prevalence of *A. albimanus*. Three-quarters of the cases are *falciparum* infections. In Maracay, an important agricultural and industrial town, 445 metres above sea level, malaria is an important cause of mortality in certain years: there is a well marked five-year cycle. Here May to October are the months of maximum prevalence and *vivax* infections preponderate. *A. pseudopunctipennis* is the anopheline most in evidence during the malaria season.

Attached to the Central Office of the Division of Malariology is a laboratory and a school of malariology. Thirteen doctors and 23 fifth-year students attended the first course. The staff of the Division during the year examined 68,551 persons, visited 22,071 breeding places, and classified 21,126 adult mosquitoes and 222,543 larvae.

Norman White.

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